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DECEMBER 16, 1943

The IRON AGE

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Scales At War

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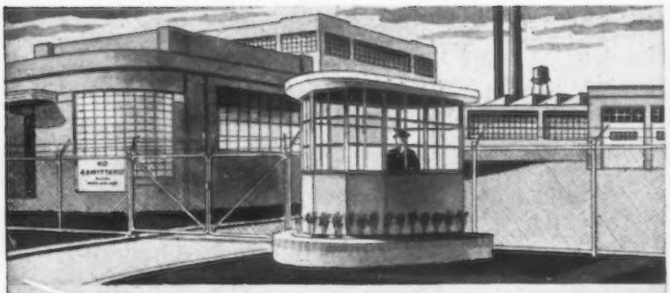
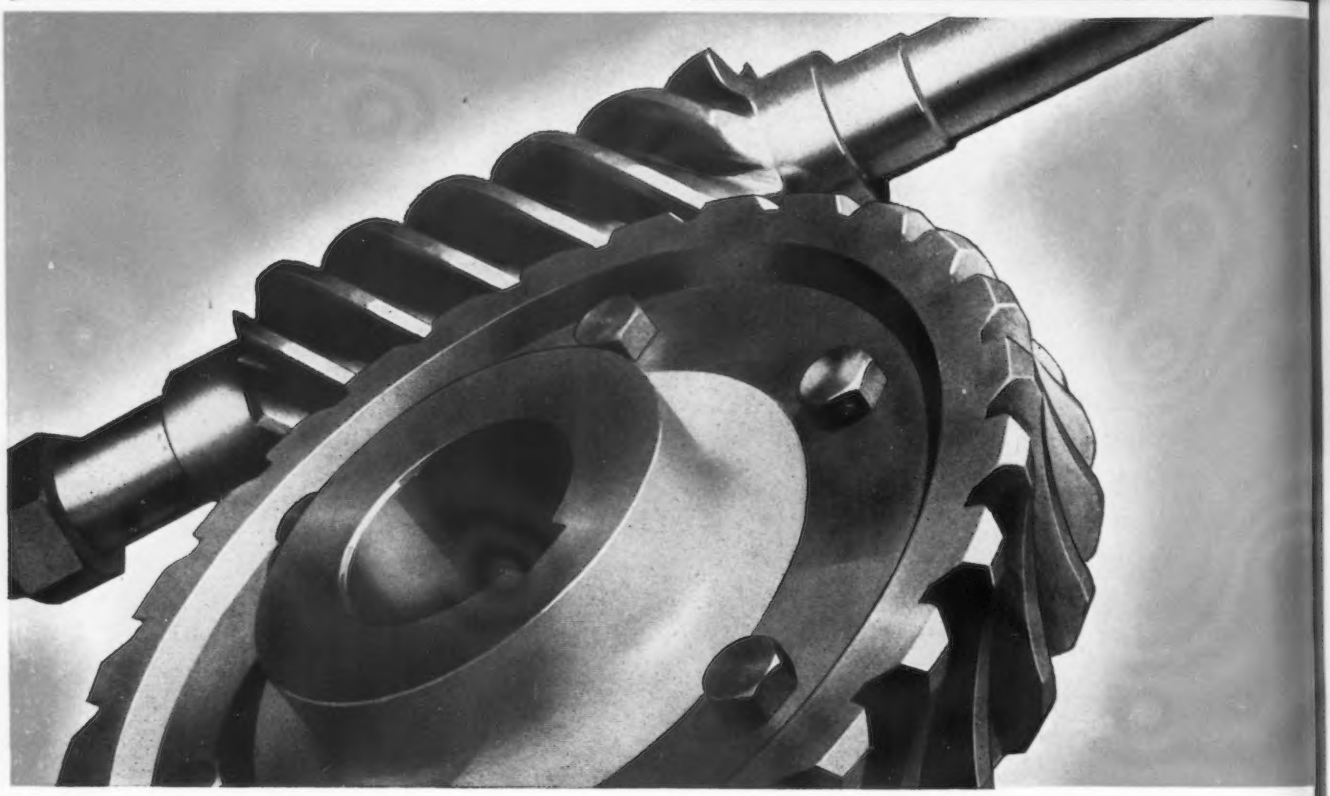


All day today and

all night tonight



Straight through every minute of the 24 hours your Cleveland Worm Gear Speed Reducers stand competent guard—they deliver dependable power to keep equipment going, come what may.

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"Twenty-four hours a day beginning 1929—our Clevelands get no special attention"—*heavy metals.*

"For nearly 20 years Clevelands have given uniform operation, minimized shutdowns"—*copper and brass.*

"Day and night since 1923; Clevelands insure uniform operation"—*portland cement.*

"Around the clock for 20 years—Clevelands keep our equipment going"—*mechanical rubber.*

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CLEVELAND WORM GEAR

SPEED REDUCERS

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 152, No. 25.

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Executive Offices
Chestnut and 56th Sts.,
Philadelphia 39, Pa., U.S.A.

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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year. Single Copy, 35 cents.

Cable Address, "Ironage N. Y."

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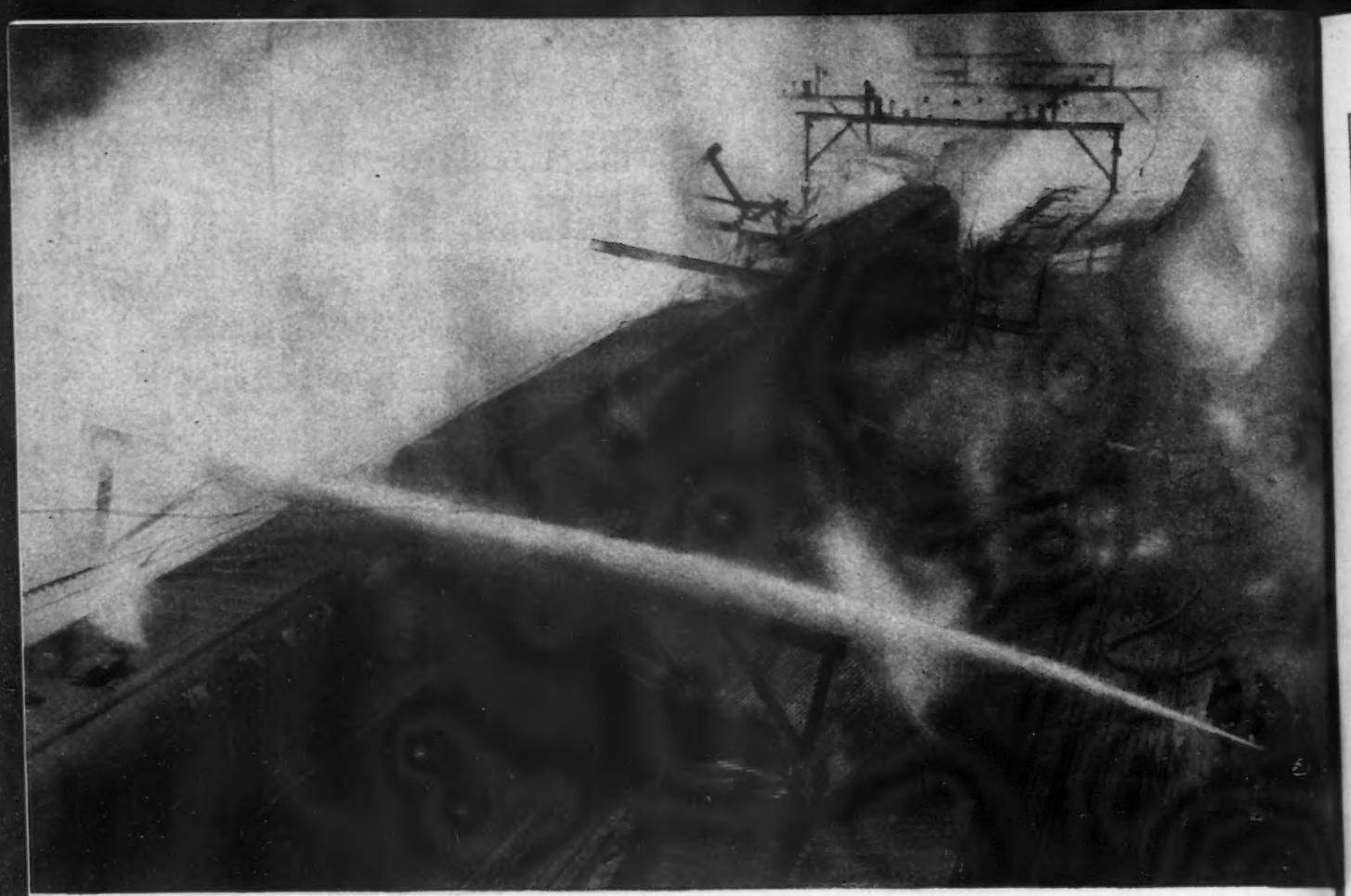

Ryerson Steel Delivered While the Fire Still Burns

IT is Sunday, September 12, 1943. . . . A disastrous fire is destroying the train sheds of the Pennsylvania Railroad's great Broad Street Station in Philadelphia, all important rail nerve-center, vital to the Nation's war effort!

This calls for action! One thought is in every Pennsylvania man's mind —rebuilding—restoring service—the quickest possible way. Construction materials are needed immediately—but how to get steel?

At 3:10 P.M., the fire still burns fiercely. The railroad's purchasing department 'phones a Ryerson man at his home. The order is for 60-foot channels. Can Ryerson deliver?

Ryerson *can*—and *does,* in just one hour and twenty minutes! At 4:30 P.M., a Ryerson truck pulls up at the blazing station with the steel! Before the embers were cold, the rebuilding of Broad Street's train sheds was started.

Good service? Yes, say Pennsylvania officials! Co-operation in an emergency to avoid a tie-up of vital war facilities? Yes! Proof that "steel in stock for immediate shipment" is a Ryerson reality. Proof that the Ryerson organization is ready and able to meet every steel-service requirement, however tough.

In any emergency—and in your everyday purchases—you can depend on Ryerson for steel. Call, wire or write the nearest of the ten well-stocked Ryerson plants.

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON STEEL-SERVICE

The
IRON AGE

ESTABLISHED 1855

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Dec. 16, 1943

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Mr. Baruch Has No Bicycle

INDUSTRIALISTS and business men in general welcomed the appointment of Bernard M. Baruch as director of post-war economic adjustments. Mr. Baruch is universally admired and respected; has an intimate knowledge of the needs of makers, merchandisers and consumers and unquestioned good judgment.

In his capacity of chief reconversion engineer of the United States, Mr. Baruch will have the support of the rank and file of our people as well as of those who direct the management of the manufacturing and selling of goods. In other words, he will have plenty of support from below.

How much support he will get from above is another question. Any man charged with the responsibility of directing the changeover in a nation's industry from war to peace has a long way to go in a very short time. To cover this distance, Mr. Baruch has been given a title. But he has not, apparently been given even a bicycle. What he really needs to help us all win this race against time is not merely a bicycle but the finest and fastest streamlined conveyance that the country can supply to take him from here to there.

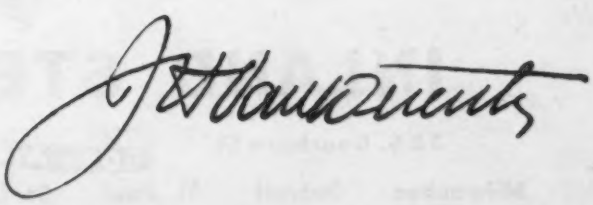
The mechanism that Mr. Baruch will need, and that the American public will need, to put his ideas into effect is an ably staffed body, organized and experienced in every branch of industry and business, that can act swiftly, decisively and with authority in any situation that may arise. This is the only sort of reconversion conveyance that will reach the post-war objective in time to prevent disaster, the closing of factories and the laying off of workers.

Ironically enough, there is such a conveyance already built and functioning well in the form of the War Production Board. It has done a splendid job in organizing and directing our industrial war efforts. It has been manned, and still is, by some of the best men in the country. But these men are of the type who do not stay on a train after it has reached its announced destination.

Already some of these men are getting off the train because they think its destination has been reached or is in sight. But it is not in sight by many miles or many months. It is up to the chief train dispatcher of America to tell these gentlemen that the journey is only half over when the war is finished and that they should not get off at the half way station.

Right now is the time for the Supreme Commander of American Industry and Business to take time off from his job as Commander-in-Chief of our Army and Navy and add just one syllable to the title of the War Production Board. Make it the Post-War Production Board. And give Mr. Baruch a ticket to ride on this streamlined conveyance.

What a world of difference that extra little syllable would make!



Jimmy is anxious to see his Dad—his Mother is working for Victory.

Jimmy's Mother is now head of the crane hookers in one of the Inland departments.

Jimmy's Dad Fights, His Mother Works, *To Help Bring Victory*

Little Jimmy's Dad, Sgt. James C. Maloney, is doing his bit in an Air Force fighter squadron to win this war. Jimmy's mother is doing her bit, too, as head of the crane hookers in an Inland Steel Co. department.

Sergeant Maloney left Inland to enlist in September, 1940. Jimmy was only about five months old when his Mother, also a former Inland employe, returned to work. She wanted to do her part, along with Sergeant Maloney, to hasten the day when peace will return and Jimmy will see his Dad for the first time.

This little family story is typical of the American spirit for Victory—a spirit which moves men and women to do all in their power to help supply fighting equipment needed by America's fighting men to crush the enemies of Democracy.

Do you know a man, or woman, not now in war work—some person who can take a place in industry left vacant by a fighter? If so, urge him or her to join the ranks of war workers and hasten the day when Jimmy's Dad and all the other victorious Yanks will come marching home.

ARMY E NAVY

INLAND STEEL COMPANY

38 S. Dearborn St. — 50th ANNIVERSARY — Chicago 3, Illinois

Milwaukee Detroit St. Paul St. Louis Kansas City Cincinnati New York

The IRON AGE
DEC., 16, 1943

NEWS FRONT

• Shipping unsheared plates from Republic's Cleveland strip mill to shipyards will increase cost by as much as $2.89 a ton because of increased freight and differential in scrap price ceilings in Cleveland and the shipbuilding centers. Republic will also lose the scrap itself.

• Ford Motor Co. is now operating a sulphur extraction plant to purify coke oven gas. About six tons of 99 per cent pure sulphur are extracted daily from the 54,000,000 cu. ft. of coke oven gas produced every 24 hr. at the Rouge plant.

• By reducing corrosion in the heat treat furnaces, magnesium smelters, armor plate building, etc., Ford officials estimate a three-year liquidation of cost.

• Holders of large steel inventories in the New York area are moving stocks through WPB's Redistribution Department. Rather than be caught with large stocks in the event of sudden victory, they are selling quantities at below ceiling.

• With aluminum already challenging copper for second place in metals production, and secondary aluminum slated to go as low as 4c after the war, prices for sand castings may challenge iron or steel castings. The automobile industry is said to be contemplating use of from 200 to 500 lb. of aluminum in every automobile.

• To facilitate the reabsorption of workers released by War Department rescheduling, cutbacks of plant shutdowns, the War Manpower Commission will be notified of such orders.

• Increased cutbacks will stimulate unions in mass production industries to demand a return to the 40-hr. week. While seeking shorter hours, effort to keep higher wages will continue. Failure to rollback prices is the reason given.

• Allied raids on German synthetic rubber plants are actually not directed toward the synthetic plants but rather toward carbon black installations, the critical component or bottleneck of rubber production.

• What many would like to know is how-come a sudden bonanza in copper and brass? Steel shell cases and cartridges are being switched back to brass; steel clad with gilding metal is being killed off; and fuse parts (several pounds apiece for each large bomb) are being converted from malleable iron back to brass.

• Meanwhile: The steel situation shows an easier supply situation, whereas copper mining was classed a month ago by WPB as highly critical, with manpower directed to it even to the detriment of all other mining operations.

• The shift back to brass is confusing in view of the elaborate publicity put out by Ordnance as regards mastery of engineering and metallurgy details of steel cases.

• Total capital now invested in German industry is about 30,000 million Rmk, ($12,000,000,000) equivalent to several months' American war output.

• One of the Luftwaffe's "backroom" boys, Fliegerstabsingeneur Hans Busch, in an address before Swedish aeronautical experts predicted the appearance soon of 6000 hp. motors, and a stratosphere airplane with a ceiling of 79,000 ft. American experts expect the former, are skeptical of the latter.

• The use of Russian women for operational flying seems to puzzle German propagandists. While some state that these women are poor pilots, others point out that among fighter units made up of female crews are several which are first-class.

• Chevrolet is looking forward to early production of passenger cars. The company has sufficient plants and standby facilities to maintain its aircraft armament program while producing civilian cars in branch plants.

• The ban on migration war workers into Cleveland has been lifted by USES. The city has now been declared an area of acute labor shortage. No residents can be found to fill war job vacancies.

Shaved Aircraft Gears

By Ivan E. Calicoat
Gear Supervisor, and
Curt A. Payntor
Chief Metallurgist, Studebaker Aviation Division, Studebaker Corp., Fort Wayne, Ind.

. . . Many plants have tried to solve the problem of distortion in subsequent heat treatment by use of press quench fixtures. Avoiding the use of such fixtures, this plant has found that by proper controls, the amount of distortion can be made uniform enough to be anticipated by modification of tooth form in the shaving operation so that the end result is the desired involute.

AIRCRAFT engine gears from the beginning have been designed from the point of view of grinding rather than shaving and manufacturing facilities obviously corresponded. It was natural therefore that when this plant was first equipped for the sole production of gears for the Wright model 1820 1200-hp. engine, the emphasis was placed on grinding. A number of gear grinders of both the generating and form wheel type were installed and it is only recently that four shaving machines were purchased to handle the production of just one of the 43-odd gears of all types in this engine. More gears are under study for possible conversion to shaving.

On the other hand, most of the production executives in this organization have a background of experience in the manufacture of automotive gears wherein shaving has been the accepted practice for years. With this background, it was only natural to seek out gears that adapted themselves to shaving and to make the conversions.

Now that production runs are becoming large enough, the advantages in economy and even in finish begin to show up. The four shavers displace 23 generator type gear grinders and shows substantial savings in the purchase of additional grinder equipment for a current expansion program, since the grinders originally used on the shaved pinions can be released for new work. Machine for machine, production is in the ratio of 5:1 in favor of shaving.

The higher the hourly output required, the greater the economic advantages of shaving over grinding. In his paper* on gear shaving presented before the SAE last spring, A. W. Harris of Chevrolet Motor Division of General Motors indicated that in the example of one gear, if production were less than 2.9 gears per hr., there was no economic advantage in shaving over grinding. Here at Studebaker, over 100 shaved gears per hr. are processed.

..* *"Shaved Gears for Aircraft Engines", by A. W. Harris,* THE IRON AGE, *Aug.* 5, 1943, p. 58.

Precision in shaving is built into the machine and the cutter and the human element is virtually eliminated. In grinding, on the other hand, errors in spacing, runouts and grinding checks and burns are all the result of factors in control of the operator who may sacrifice quality to obtain quantity under a piecework system. Profilometer tests show a better average surface finish on shaved profiles than on ground ones, which usually must be lapped to remove the grinding fuzz.

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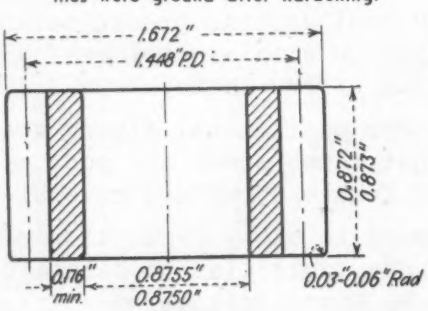
FIG. 1—Details of small planetary pinion which is now being successfully shaved. Formerly the tooth profiles were ground after hardening.



15 TEETH
0.210" Whole depth
0.1204" Corrected addendum
0.3032" Circular pitch
10.36" Diametral pitch
Material: AMS 6250C

Besides, on shaved gears the tool marks are more nearly in line with the rolling and sliding action of the teeth, whereas grinding marks are directly across the face of the tooth.

Limitations Cited

In the many discussions on the subject of shaving versus grinding of aircraft engine gears that have taken place in meetings of the Aircraft Engine Division of the Automotive Council for War Production (now known as the Central Aircraft Council), the general approach to the basic problem of distortion of the gear as a result of hardening has been to concentrate on design of press quench fixtures to prevent such distortion. Here at Fort Wayne, the opposite stand is taken, namely that if a gear is of such a design that it has to be press quenched (and there are dozens of quench presses in this big plant), it is uneconomical to finish the gear by shaving in the green state. Such gears logically should be ground. If a shaved gear is to be successfully press quenched, so much added accuracy is needed in the machining of holding and locating sections which are otherwise not critical that any savings in cost of finishing over grinding are offset by refinements in machining the blank. If the surfaces gripped in the press are not accurately machined, there is likelihood that the press pressure itself will cause distortion.

A gear with a thin web section and an offset hub is typical of one that should be finished by grinding rather than by shaving. Quenching stresses are bound to cause the web to act as a bellows and cause displacement of the hub with respect to the gear teeth and change in pitch diameter will occur along with other distortions.

The limitations recited above rather narrow the field of application of shaving of aircraft gears, and it is only natural that the first gear or pinion to be shaved in production in this plant should represent the ideal case. Since press quenching was ruled out at the start, there was only one

alternative in solving the problem of distortion, namely:

Coordinate all the factors involved, such as selection of steel, forging, stabilization of structure, machining and subsequent heat treatment, so that the distortion in hardening is consistent and therefore can be anticipated by modification of tooth form.

The best way to illustrate how this is accomplished will be to describe the step-by-step processes of manufacturing the 15-tooth planetary pinion, which is now being shaved 100 per cent. In the Wright engine, 20 of these pinions are mounted on a spider and float between a 135-tooth internal bull gear, which has shaped and lapped teeth and a 105-tooth gear which is hobbed, ground and lapped. The large number of pinions involved represents an ideal example from the point of view of production quantities.

Consistent Distortion Sought

The success of shaving this carburized pinion is due to the fact that although distortion in heat treat does occur, it is so consistent from gear to gear that it can be anticipated by modifying the tooth of the shaving cutter and deliberately cutting a gear with a tooth profile that varies from the true involute. When hardened, the tips of the teeth tend to move out and the involute falls off at the tip of the tooth. It is for this distortion that modifications are made in shaving the teeth. A contributing factor to the success of the job is obviously the form of the pinion. As the sectional views, Figs. 1 and 2, indicate, the thickness of the rim at the bottom of a tooth space is very nearly equal to the chordal tooth thickness at the pitch line. It is always an advantage in controlling hardening distortion to have only minor inequalities in sections.

The material from which the pinion blank is forged is AMS 6250 C (SAE 3312) having 3½ per cent nickel, 1½ per cent chromium and 0.08 to 0.13 per cent carbon. It is an electric furnace steel suitable for carburizing in light sections. Although supplied by four or five steel mills and forged by several subcontractors, which results in obvious variations in heats, there is good consistency in the distortion of these pinions in the final hardening process. This is partially attributed to the fact that the material is brought to a uniform microstructure in the normalizing and annealing cycle.

First Normalized

When the forgings enter the plant they are visually inspected, and are

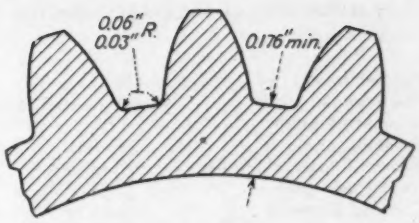


FIG. 2—Enlarged cross-section of the pinion shown in Fig. 1. Uniformity of section is a big factor in controlling distortion in hardening.

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then heat treated to give a uniform structure for machining. They are then normalized at 1725 deg. F. for 1 hr. 15 min. at heat, this temperature being 25 deg. above the subsequent carburizing temperature. Annealing takes place at 1050 deg. F., slightly varied with different heats, but before entering this zone of the furnace the forgings are cooled to 500 deg. in the cooling zone with the aid of a circulating fan blowing air over cooling coils and directed against the work by baffle plates. After annealing, the forgings cool in a vestibule to 350 deg. and finally in air. This cycle produces a partially spheroidized structure of sorbite and globular carbides in a matrix of ferrite and a hardness of 210-250 Brinell. An effort is made to keep the hardness on the high side and to obtain a well dispersed structure in order to facilitate obtaining a good finish in the gear cutting operations. Ferrite which is normally present in large proportions in low carbon steels is a gummy constituent which tends to ball up on the tool and produce tears in the work. After heat treatment,

See also "Relationship between Microstructure and Machinability", by Norman E. Woldman, THE IRON AGE, *June 19 and June 26, 1941; also "Machinability vs. Microstructure in Gear Steels", by N. E. Woldman and R. J. Metzler,* THE IRON AGE, *Nov. 6, 1941.*

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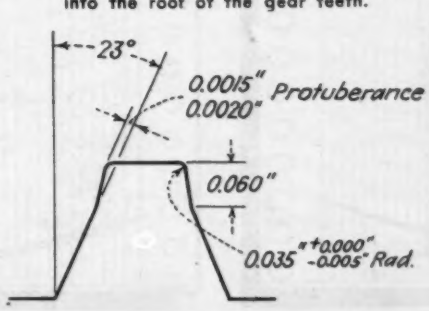
FIG. 3—The protuberance placed on the hob teeth serves to blend the root radius into the involute, since the shaving cutter does not get down into the root of the gear teeth.



the machinability of these forgings is about 40-50 per cent of SAE 1120.

The normalizing and annealing furnace is an electrically heated pusher type furnace with non-scaling atmosphere made by cracking natural gas and mixing it with air in the ration of 1:6.

The machining operations in the blank consist of drilling the hole in the blank and rough and finish broaching it to size, then chamfering and turning the o.d. and facing both ends, finally grinding both faces so as to minimize errors when mounting the blanks in multiple on the hobber arbor. Before hobbing the hole is packed and the blanks copper plated to protect those areas which are to remain soft.

Hobbing Modifications

It was in the hobbing that the first modifications in procedure were made in changing over from a ground pinion to a shaved pinion. In order to strengthen the tooth and control the blending of the root radius to the involute, since the former is not touched by the shaving cutter, it was necessary to resort to a protuberance hob. Modification of the rack form is shown in Fig. 3. The hob size also was changed from 3 in. to 4 in. in diameter and more gashes put in it to produce a smoother root. And because little correction of form is possible in the shaving operation, Class A hobs are employed, ground with radial relief. These hobs have tapered holes to assure a concentric fit on the machine arbor and minimize runout.

To get an improved surface finish on the teeth, the hob has been reduced from 0.050 in. per rev. to 0.025 in. and "climb cutting" is used to eliminate the susceptibility to tears mentioned previously as being due to the large amount of free ferrite present in this steel. Halving the feed necessitates the use of 50 per cent more hobbers, but this increase is minor compared to the reduction in grinders as compared with shaving machines. In climb cutting the direction of hob rotation remains the same as in conventional hobbing, but the feed is reversed, being away from the headstock rather than toward it. Hob feed proceeds from left to right and each hob tooth takes a deep bite at the start of the cut. Four blanks are hobbed at a time on the machine, which is a Barber-Colman horizontal type. Sinclair Carnite base oil (chlorinated-sulphurized fatty oil) is mixed in the ratio of 1.3 with 82-sec. Saybolt paraffin oil as a coolant, the resulting mixture viscosity being 200-sec. at 100 deg. F.

Burring of the ends of the teeth follows hobbing, then the gears are put on the National Broach shavers. One man tends two of these Red Ring gear finishers, of which there are four, and each machine has an output of 30 pinions per hr. or a net floor-to-floor time of 2 min. This compares with a grinding time of 30 min. for three blanks on the arbor or 10 min. each. Formerly 23 grinding machines were assigned to this pinion job. In the current expansion program, these are being set aside for other work not suitable for shaving. Again Carnite base oil mixed 1:3 with paraffin oil is used as a coolant for the shaving operation.

Specifications of the rotary shaving cutters are:

No. of teeth	74
Helix angle	10 deg. R.H.
Diametral pitch	10.36
Pressure angle	23 deg.
Chordal tooth thickness	0.148 in.
Width of tooth	¾ in.
Outside diameter	7.260 in.
Cutter cost	$185.00

Cutter life is 5000 pinions per grind and it has five usages or a total of 25,000 pieces. The cutters are returned to the factory for resharpening as certain modifications in tooth form are necessary to correct for heat-treating distortion (compare Figs. 4 and 5). It should be mentioned that the machines are set to produce a crown of 0.0002 to 0.0004 in. on the teeth to aid in centralizing the tooth bearing area. Rotary type cutters operating on the cross-axis principle (10 deg. in this example) are preferred for straight spur gear finishing. Rack type cutters, which were first introduced in automotive gear finishing practice, are preferred for helical gears, which are seldom encountered in aircraft engine production.

The finish obtained by shaving is excellent, being about 10 micro-in. r.m.s. as against 25 to 35 micro-in. for grinding. Only a small amount of metal is removed—0.008 in. over p.d. pins, or about 0.00175 to 0.0020 in. on the involute flank.

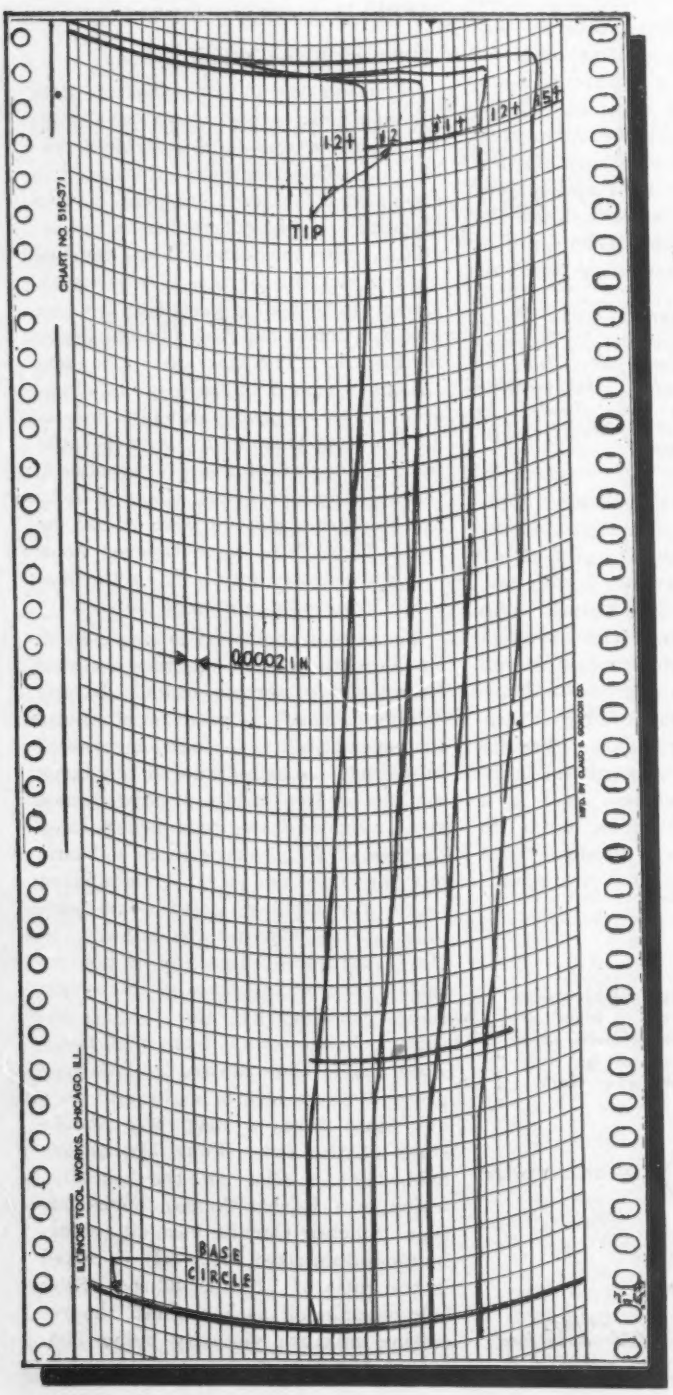


FIG. 4—Typical chart taken from an Illinois involute tester, showing the deliberate distortion of the involute made in shaving the teeth of the pinion illustrated in Fig. 1. Each curve is for a different tooth of the "green" pinion.

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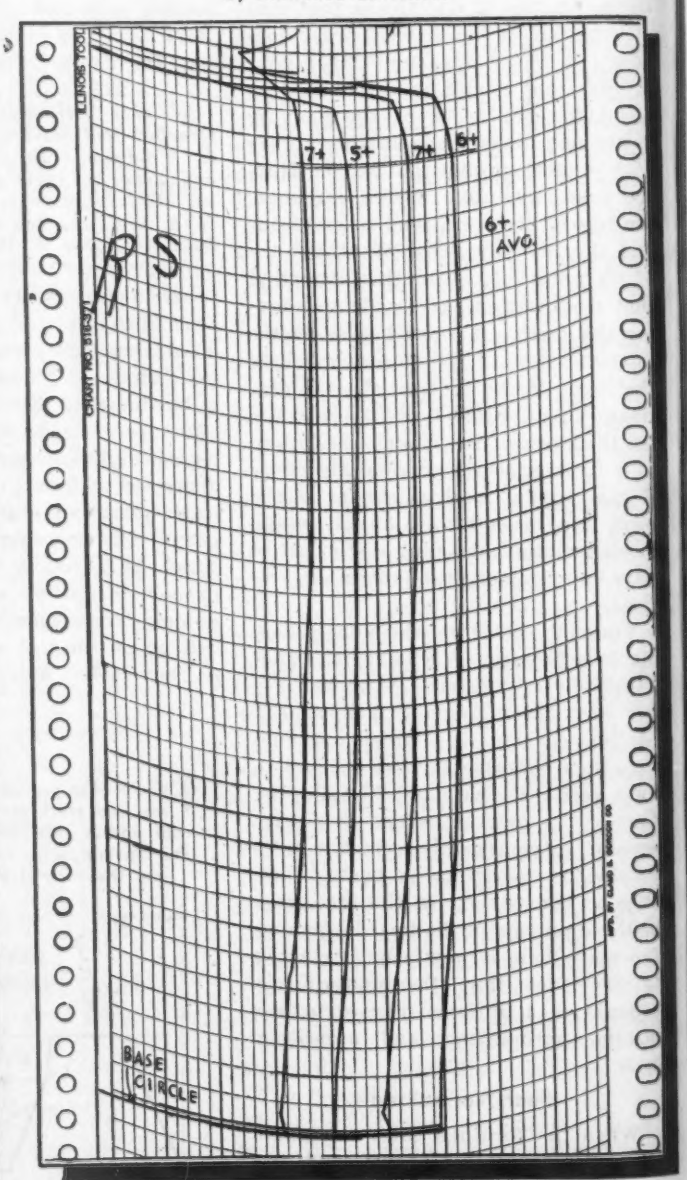
FIG. 5—Involute test after hardening of the same pinion charted in Fig. 4. Note how the involute has been pulled back into line by controlled distortion.



After being inspected and degreased, the pinions are ready for carburizing. Much of the success of the shaving process from this point on is governed by uniformity in control. As indicated earlier, what is being sought is not elimination of heat-treat distortion, but control of it to a predictable amount.

Carburizing

In the first place it should be noted that carburizing takes place after shaving rather than before. This choice was made to avoid back tracking in handling parts in and out of the heat-treating department. Besides, carburizing is not the critical treatment so much as the hardening.

Natural gas is used as the carburizing medium and the depth of case sought is 0.032 to 0.036 in. There are 12.2 sq. in. per piece to carburize and this governs the flow of natural gas, which is 20 cu. ft. per hr. for a charge of 1000 parts in a 20 x 36 in. Leeds and Northrup Homocarb. The finished pinions are loaded in circular trays, three layers to a tray and the load is five trays high for insertion in Homo pot-type electric furnaces. Furnace is at 1200 deg. F. when charged and is slowly brought up to 1700 deg. and held there until 0.032 in. case is formed, which takes about 2½ hr. Notched test bars which accompany the work are pulled out of the furnace and examined for depth of case at the end of 1 hr., 2 hr. and the end point.

Then the furnace temperature is dropped to 1500 deg. and the gas flow increased for ½ hr., during which time the total carbon penetration is increased approximately 0.003 in. and the outer zone of the case is enriched in carbon. A soot deposit is deliberately created during this period in order to prevent decarburization during the transfer and while the pinions are in the covered cooling pit. Here the work is allowed to cool slowly in a gaseous atmosphere for about 2 hr., at which time the temperature has dropped to 450 deg. Further cooling to room temperature takes place outside the pit. Soot is removed by a shot blast in a Pangborn Rotoblast table type machine. The pieces are run through three times to assure cleanliness.

As an "insurance policy" to prevent possible decarburizing during hardening, the pinions are copper plated 0.0005 to 0.0008 in. all over. Hardening is done in a roller rail type furnace made by the Electric Furnace Co. The pinions are loaded on trays, 24 per layer, two layers high and every 7 min. two trays are pushed out of the furnace into the hydraulic elevator quench, the total furnace cycle being 1 hr. The initial zone is at 1420 deg. and the remaining three zones at 1485 deg. Cracked gas mixed with a small percentage of natural gas serves as a protective atmosphere. Quench time is 3 min., the quenching medium being 82-sec. Saybolt paraffin oil.

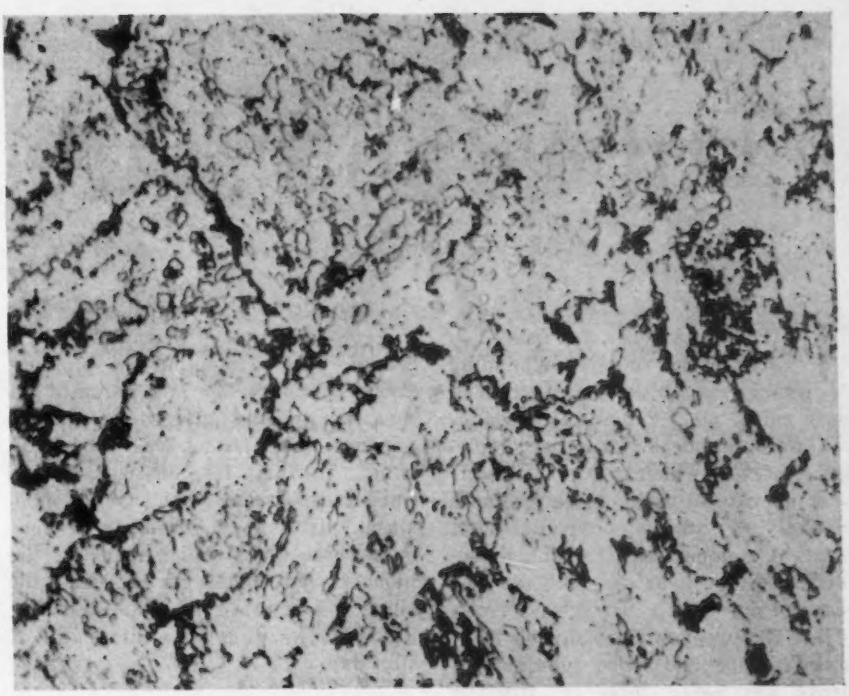


FIG. 6—Microstructure of a pinion gear normalized at 1725-1750 deg. F. and annealed at 1060 deg. prior to hobbing and shaving. The structure reveals the presence of sorbite and partially spheroidized carbides with a matrix of ferrite. (1500 x.)

To complete the transformation of the austenite to martensite and hence stabilize the structure, the gears are given a sub-zero treatment at —60 to —70 deg. F. Initially dry ice was used for this purpose until mechanical equipment (Kold-Hold) with accurate temperature control could be installed. This was being readied for use at the time of writing this article. One hour of the cold treatment is sufficient to increase the hardness as quenched from 62 Rockwell C to 66-68 C. Subsequent drawing for 3 hr. at 325-350 deg. F. in a Homo pot furnace reduces this hardness to 61-63 Rockwell C.

Drawing in the Homos is followed by shot blasting, then inspection including a complete distortion check on 25 pinions out of every lot of 1000, which is the furnace charge. This means that the same 25 pinions, properly identified, are also completely checked in the green state following shaving. The Illinois involute form tester gives the best check on controlled distortion. A comparison of Figs. 4 and 5, which are reproductions of typical charts produced on this instrument, shows the deliberate involute form errors introduced in the teeth by the shaving process and the correction obtained during heat treat. In the green gears, Fig. 4 for example, there is a uniform variation of about 0.0010 to 0.0013 in. from the bottom of the working face to the top. The same gears tested for involute form after heat treatment, Fig. 5, shows variations of 0.0004 to 0.0007 in., well within the tolerance of 0.0010 in. on involute forms.

In addition, the usual measurements of pitch diameter, backlash, runout, etc., are made but the graphical record of involute form is the basic control point of the coordination machining and heat-treating operations just described. The results are adequate proof of the soundness of the decision to shave rather than grind these small pinions.

A number of operations remain to complete these parts. The hole must be finish ground while chucked on its pitch diameter and its edges radiused, then the two faces finish ground and finally microfinished and buffed, since they serve as end thrust surfaces. The teeth surfaces are Tampico brushed. Finally the hole is lapped to size before the pinions are given a 100 per cent Magnaflux inspection. Considering its simple geometric shape, this piece has an extremely large number of operations to bring it to its final state of perfection. Including 13 inspections, there are no less than 54 operations, of which shaving is just one, but a big enough one to form the basis of this article.

Tubes and Tube Making

TUBES and pipes are needed in carrying out the ever-expanding program for the construction of more ships, more tanks, more planes and those hundreds of other implements of war which it is not possible to enumerate in their entirety. There is hardly any other structural element of greater importance for the prosecution of the war as well as for peaceful pursuits.

Just a few examples may be mentioned: More and more tubular elements are being used in airplane frames. This is done not only on account of the high weight-strength ratio of tubes as compared with that of open rolled sections but also for the reason that a tubular strut, when hit or pierced by a bullet, will frequently lose less of its original strength than an open section in the same circumstances. Moreover, a larger percentage of bullets than otherwise will be diverted and slip off upon hitting a tubular element, particularly one having a streamlined shape.

From among the peaceful uses it will do just to mention the pipeline. Every civilian's life and pursuits are now being badly affected because an adequate pipeline net was not laid in time. In fact, its construction has until recently met with strong opposition. It is a good thing that now, by a route along which many of the pioneers ventured forth to Texas, the oils flow east in a 24-in. pipe, the "Big Inch," forwarding 10 million gal. of oil a day.

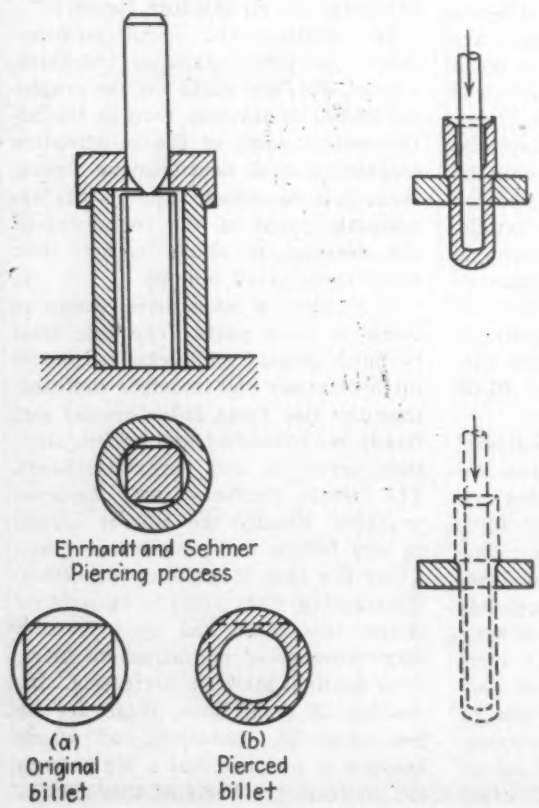
Inventors and Inventions

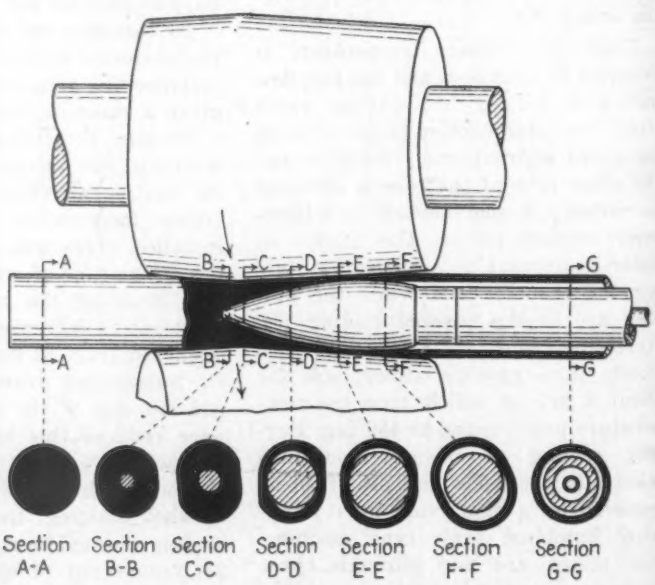
In view of the extraordinary importance tubular products have won it seems timely to review both the great inventions made in the manufacture of tubes and certain developments that took place in this field. The basic principles of the art have not greatly changed in recent decades. Yet the improvements the industry has carried out and the variety of uses to which its products have been put are simply admirable.

Fundamentally, there are two manufacturing processes by which tubes and pipes are made. The one starts from long flat strips of metal, called skelp, or from flat plates. The other process starts from solid billets. A third process, cupping, had been almost abandoned before the war but has recently gained new importance in the making of steel shell cases.

Beginning the description of these processes with the piercing process, it must be said that this is one of the greatest inventions and represents one of the most amazing operations in the shaping of steel. The writer will, however, confine himself more or less to discussing the development of this invention in Europe of which he has more intimate knowledge.

The invention of the seamless tube furnishes an excellent example of how new processes frequently develop. It proves the fact that the perfection of such a process is rarely being accomplished by one single mind. Certain technical developments will come to a





ABOVE

FIG. 2—Schematic presentation of the Mannesmann invention of piercing a solid billet by diagonal rolling.

LEFT

FIG. 1.—In the early piercing process supposedly developed by the German firm of Ehrhardt & Sehmer, a square billet was heated to a high forging temperature and then placed in a round die block. A cylindrical piercer of sufficient diameter to force the displaced material into the four spaces between the billet and mold was driven into the billet. The tube was further processed by inserting a slightly conical mandrel into the shell and pushing both through a series of ring shaped dies of decreasing diameters.

—Development of an Industry

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By DR. BERNARD P. PLANNER

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. . . Versatility of applications as measured by current demands have brought tubes and tubular products prominently into the foreground. In this the first of a three-part article on the evolution of present day practice, the Mannesmann process of rolling hot steel bars to produce cavities and the inventions of the barrel type piercing and disk rolling mills are discussed.

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point of maturity when possible results may be anticipated, inventive minds in different places and countries will then, at about the same time, feel induced to work toward, and achieve, the very same objective. A successful process will thus be rather the result of a series of developed ideas than that of a single invention. The steel industry furnishes most striking examples of this kind: The bessemer process was developed by two men absolutely independent from each other, one was an American by birth by the name of William Kelly, the other an Englishman, Sir Harry Bessemer.

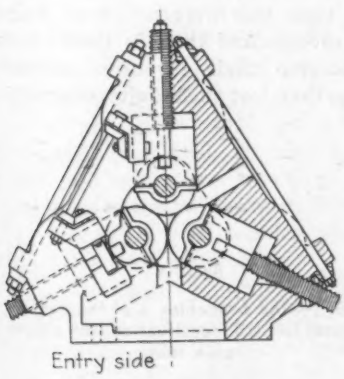
In the early eighties, Stiefel, an American, and the Mannesmann brothers of Germany attempted to replace the tedious and costly processes of boring or hot piercing of billets by presses through a continuous rolling process. It is, however, generally agreed that the priority for this invention belongs to the Mannesmann brothers who were granted patents as early as 1885. Soon after, around 1890, a number of heated patent disputes were fought out in the courts between Stiefel and the Mannesmanns. It was established that American workers were to a major degree entitled to credit for a faster mechanical perfection of the invention. In the end, as it is often the case, many manufacturers availed themselves of the advantages of both of these processes, the Stiefel type and the Mannesmann barrel roll type, whichever was best suited to the kind of work required.

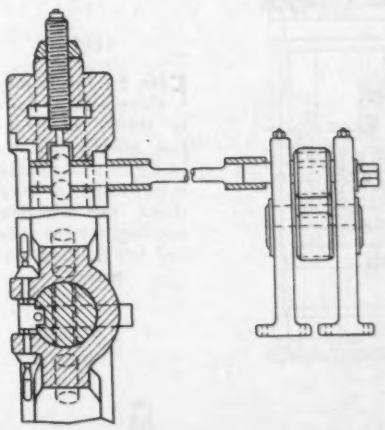
The Mannesmann Process

First the attempt was made to apply to iron and steel the extruding process in which by means of hydraulic pressure hot metal is forced through an orifice, a method perfectly suitable for the comparatively soft non-ferrous metals. For the extrusion of steel, however, this basically simple process requires enormous forces and results in a terrific wear of material. For this reason the process is even now hardly beyond the experimental stage.

Another method was simply to drill out solid billets. This was the way by which some of the old musket barrels were made.

Yet another early invention, which until not long ago was successfully employed, was a piercing method ascribed to the German firm of Ehrhardt & Sehmer. In their process the billet was heated to a high forging temperature. The piercing of the square billet then took place within a round die block by means of driving





ABOVE

FIG. 3—This one stand, barrel type, piercing machine or A-machine had rolls of about 11 in. in diameter and 5 in. long. Cylindrical chocks fitted for the roller bearings could be moved axially thereby changing the space between the rolls.

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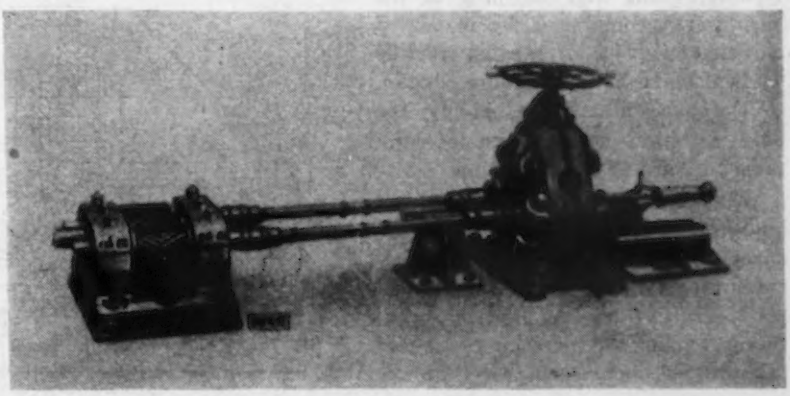
RIGHT

FIG. 4—Later model of the A-machine built in 1887. Feed was through the side of the drive and cogged cylinders were used. To improve the cavity formed, a piercing point was used. Billets about 2 ft. long and 1 in. in diameter could be pierced on this machine.



a cylindrical piercer or ram into the billet. (See Fig. 1.) The piercer had a diameter appropriate to displace the material so as just to fill the four intermediate spaces formed between the original billet and the mold. Further processing took place by the insertion of a slightly conical mandrel into the shell and by pushing both through a series of ring shaped dies of smaller and smaller diameter.

As to the Mannesmann process, this was based on an entirely novel and revolutionary idea and it is rather interesting to see how the inventors conceived it.

For three generations the Mannesmann family had been operating a well-known file factory at Remscheid, a city, which together with Solingen, another German city, was the now frequently mentioned birthplace of the German tool steel and tool industry. The Mannesmanns used in part their own self-made crucible steel. Files were then cut by hand which required highly-skilled craftsmanship. The special tool steel requisite for this manufacture was at the time partly imported from Sheffield, England, in the form of round bars and shafts. These round bars were polished in England on so-called reeling machines. The

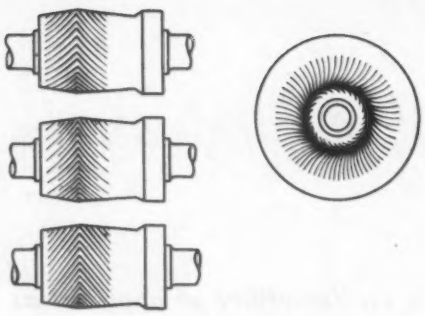


FIG. 5—Until about 1890, it was thought that the shape of the rolls determined the type of cavity formed. Therefore numerous roll shapes were tried. Here three types of piercing rolls used between 1884-90 are illustrated.

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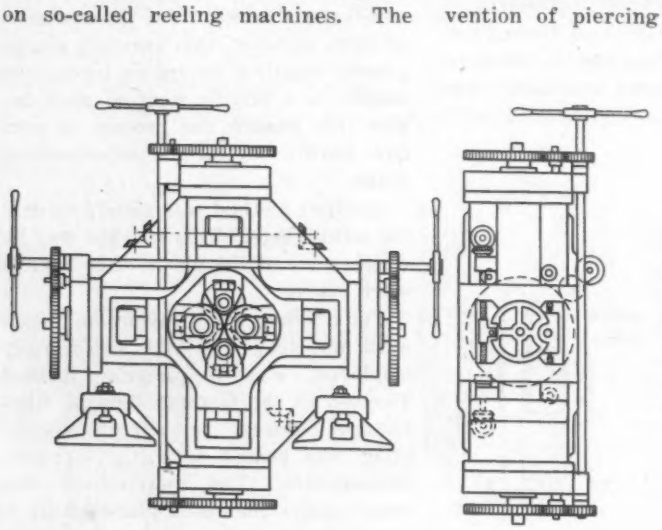
material, but there was no satisfactory explanation for this phenomenon which was apparent in certain kinds of forgings.

Two of the Mannesmann brothers, who were credited with many inventions in various other fields, had the idea to reel, or roll, hot steel bars diagonally in order to create cavities intentionally which, until then, had come about accidentally. So their invention of piercing a solid billet by diagonal rolling (as detailed in Fig. 2) was not a matter of accident but the achievement of what they had long been looking forward to and what the rolling mill engineers of the period had deemed impossible. In this instance it seems proper to state that a cavity although uneven and irregular may be produced within a solid billet without the use of a mandrel, called piercing point, between the rolls.

Without belittling the merits of this invention it must be recorded that the inventors were unable to explain satisfactorily why the cavity formed. Many and very contradictory theories on the subject were later developed.

In reviewing this outstanding invention and justly evaluating its merits it must be borne in mind that in 1885 the sciences of metallography and metallurgy were virtually non-existent. Furnaces were rather primitive and so were temperature measuring methods. The billets had to be brought to a high forging temperature and were kneaded at such a temperature. The pressure to which the billets were subjected in this process was so great that the pierced billet would emerge with a temperature that was somewhat higher than the entering temperature. All these complex processes and all those characteristic features of steel that may be summed up in the term "pierceability" have not as yet been clarified.

Little wonder, therefore, that for a long time the inventors were denied any success and that, in their efforts to develop their invention commercially, they lost their quite substantial



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LEFT

FIG. 6—The G-machine was of fairly sturdy construction, having four cylindrical chocks mounted in one stand, two carrying bearings for the rolls and two guiding elements.

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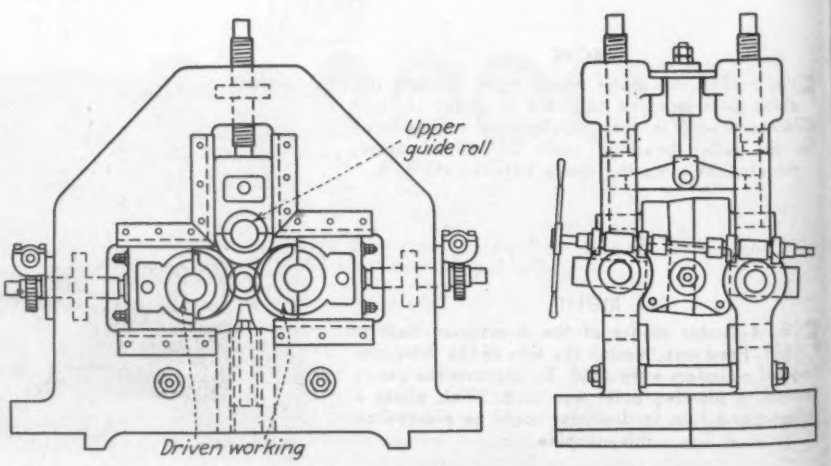
BELOW

FIG. 7—The I-machine is of the conventional two-mill construction with adjustable rolls.



feeding, sizing and polishing of the bars was accomplished by means of barrel-shaped rolls, parallel in the vertical plane but in angular position to the horizontal plane, giving the bars a rotary motion and pushing them forward at the same time.

When cut or broken to the required lengths these bars showed radial fissures issuing from the center. Sometimes the center of a bar even showed an aperture. Both the British manufacturers and the German customers felt worried about such defects in the

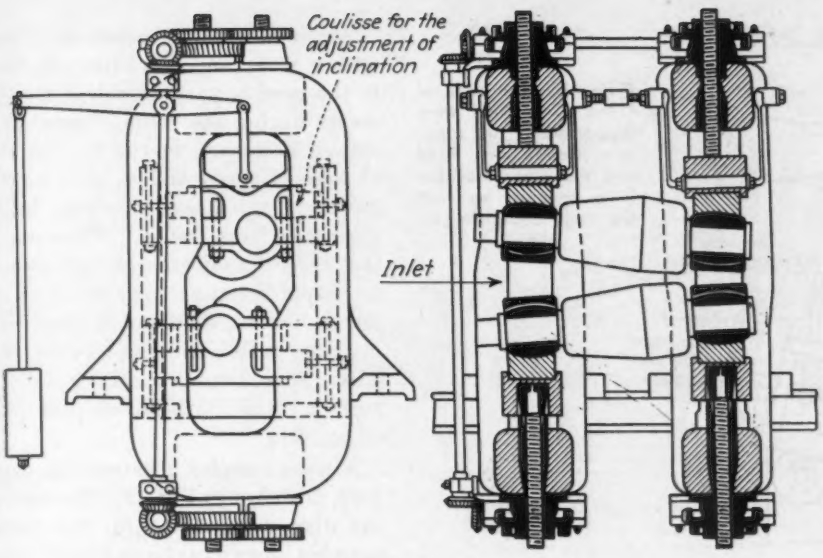


FIG. 8—Diagram of the L-machine.

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assets. Until 1900, and even thereafter, the production of seamless tubes was so expensive that notwithstanding the general recognition of its importance it could not be undertaken as a profitable proposition.

In pursuit of their basic invention the inventors made it the object of their further experiments to find the most suitable contour for the working rolls, the optimum angle thereof, and in general to master mechanically the novel and intricate problems created by this type of rolling.

Barrel Type Piercing Mills

The first piercing mill, called A-machine, which was covered by a German patent, DRP 34617, of 1885, is illustrated in Fig. 3. It was a one-stand mill with three working rolls. Experiments with this mill were already made in 1884, without the use of a mandrel or piercing point.

The rolls had a diameter of approximately 11 in. and were 5 in. long. The chocks fitted for the roller bearings were cylindrical and could be moved in the axial direction so as to narrow or widen the space between the rolls, as well as around their axis allowing the adjustment of the inclination of the rolls.

Another A-machine built in 1887, is shown in Fig. 4. Here the feeding took place on the side of the drive and cogged cylinders were now employed. It was with this machine that it was first attempted to employ a piercing point to smooth and round out the cavity. Billets approximately 2 ft. long and 1 in. in diameter were thus pierced.

Because of the lack of knowledge as to the influence of the composition of the steel, and its metallurgy, on the formation of cavities the shape of the rolls was deemed of paramount importance. Between 1884 and 1890, hundreds upon hundreds of different roll shapes were tried out in this apparatus. Frequently these rolls, shown in Fig. 5, were provided with swellings. In addition, threads of varying angles and forms were cut by hand into the surface of the rolls in the belief that the impression of the respective forms and directions of the threads into the billet stock would accelerate or retard the movement of the material.

Eventually it became possible to make tubular shells from Swedish steel, approximately 1 to 5 ft. long and 1½ in. o.d., that could be cold drawn into gun barrels. Yet the attempt to make longer tubes met with tremendous difficulties. Since the piercer could not sustain the increasing pressure it bent and the result was irregular tubes and a considerable amount of scrap. Attempts to make the piercer rods of the hardest material available and to cool them after every act of piercing brought hardly any improvement. Difficulties of such kind brought about another important invention, the so-called Pilger step process which will be discussed later.

The next step in the development, however, was the G-machine (Fig. 6). Of sturdier construction than its predecessor it had four cylindrical chocks mounted in one stand. Two of them carried the bearings for the rolls, another two the guiding elements. For the rest, the diagram is self-explanatory.

The construction of the I-machine (Fig. 7) brought further improvement. With this machine the inventors took to the conventional two-stand mill construction which is ordinarily employed in rolling mills. This construction was also based on the realization that the inclination of the rolls could be less than had until then been deemed necessary and, above all, that for a certain working range it could be left unchanged. So it became possible to simplify the whole construction. The necks of the rolls

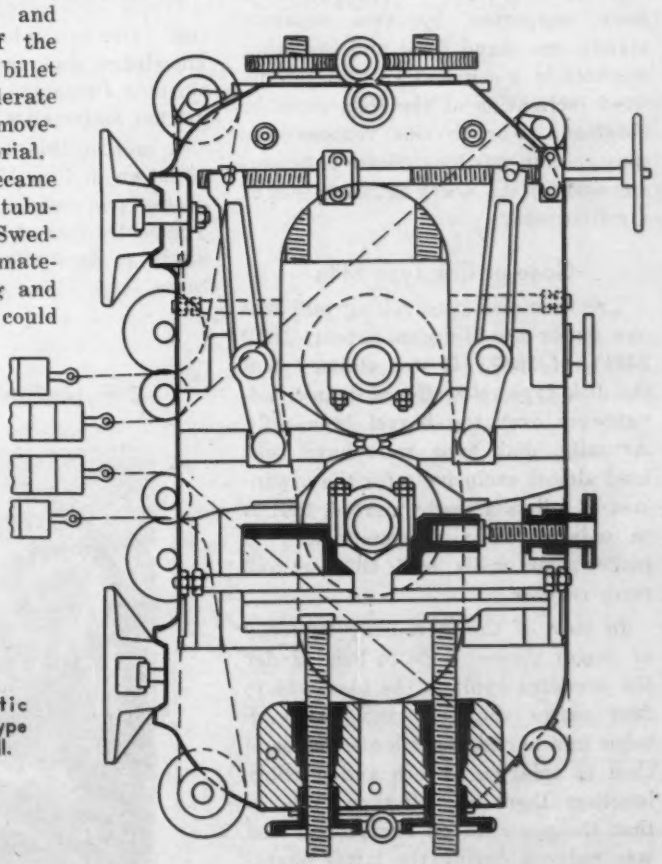

FIG. 9 — Schematic view of the D-Type barrel piercing mill.

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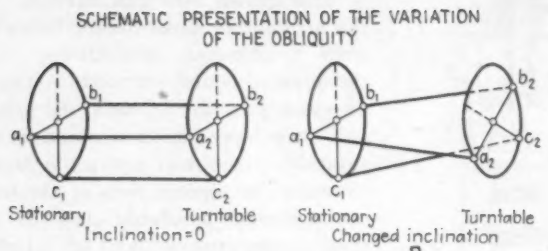
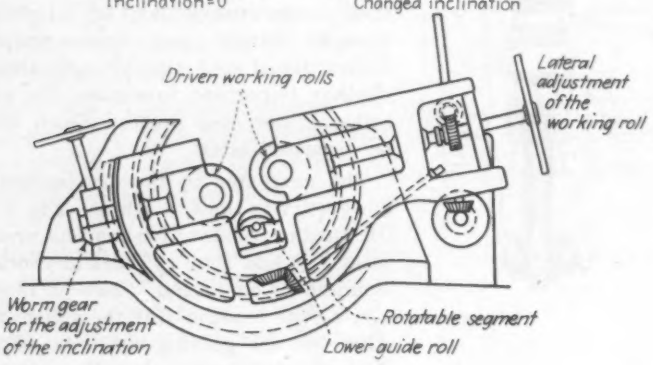


FIG. 10—The rolls of the C-machine were supported by two separate stands, one fixed and the other movable in a segment so that the rolls could be inclined.


Driven working rolls
Lateral adjustment of the working roll
Worm gear for the adjustment of the inclination
Rotatable segment
Lower guide roll

were so arranged that they rested independently and could be adjusted in the sturdily constructed stands with the chocks fixed between straight guiding planes. This construction has been adopted as the basis for modern piercing mills of this type.

At the same time, the L-Machine (Fig. 8), D-machine (Fig. 9) and C-machine (Fig. 10) were developed. The C-Machine represents an interesting kinematic solution of the eccentric adjustability of the rolls. They were supported by two separate stands, one stand fixed and the other movable in a segment so that the desired inclination of the rolls could be obtained. For obvious reasons this construction was too delicate to be serviceable for the heavy requirements of a rolling mill.

Cone or Disk Type Mills

The first disk type rolling mill was one under the German patent, DRP 34617, of 1885. It was claimed that the disk type rolls offered definite advantages over the barrel type rolls. Actually, disk type rolls have been used almost exclusively for the expansion of billets already pierced, that is to enlarge their diameters and to make their walls still thinner and more regular.

In view of the increasing tendency of longer piercer rods to bend under the pressure applied, the idea was to first pierce short lengths of rough tubes in a barrel type piercer mill and then to enlarge, smooth and possibly lengthen them in disk type mills so that the pressure on the piercer rod was reduced during the latter operation. Due to the lack of metallurgical knowledge and the non-existence of suitable furnaces, however, this idea did not materialize.

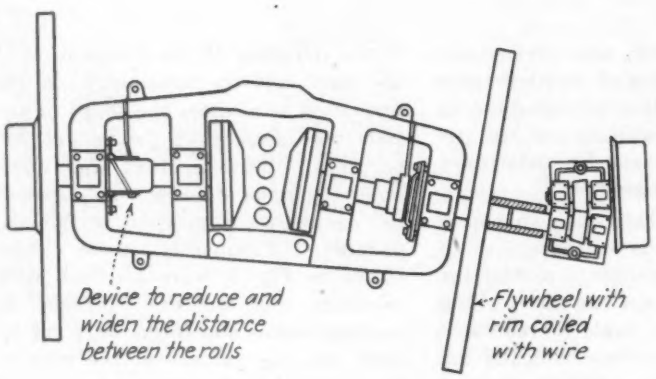


FIG. 11—Disk type mill built in 1888. Eccentricity of the two bearings was adjustable and the center line of the rolls formed an angle to facilitate entry of the tubes.

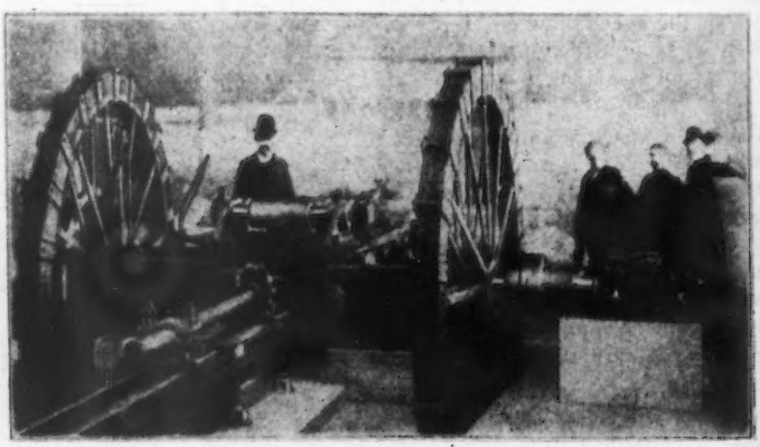
A mill of this design built in 1888 is shown in Fig. 11. The eccentricity of the two bearings was adjustable. The center line of the rolls formed an angle to facilitate the entry of the tubes.

As the sources of power were then rather weak and but little adaptable to the greatly varying power requirements during the rolling operation it proved necessary to run the machine at highest speed and to store up the power in two heavy flywheels before the billets were put in. When due to the sudden subjection to stresses or too rapid rotation, some of these flywheels burst, another flywheel was invented whose rim was coiled with wire. (See Fig. 12.) Many mills of such a type have since been constructed.

A more complex construction, dated 1890, is shown in Fig. 19. The axes of the disk rolls rested in two chocks mounted on two cast iron stands which could be turned around the center of a circular bed plate so as to allow adjustment of the angle of the rolls according to requirements. Such adjustability, in turn, required flexible bearings and other complicated structural details which can be partly recognized in Fig. 13.

Piercer points of varying shapes and contours were tried out in this mill to try to make the walls of the tube still thinner and as uniform as

FIG. 12—Flywheel built around 1890 with wire coiled around rim to prevent breakage when rapidly rotated.



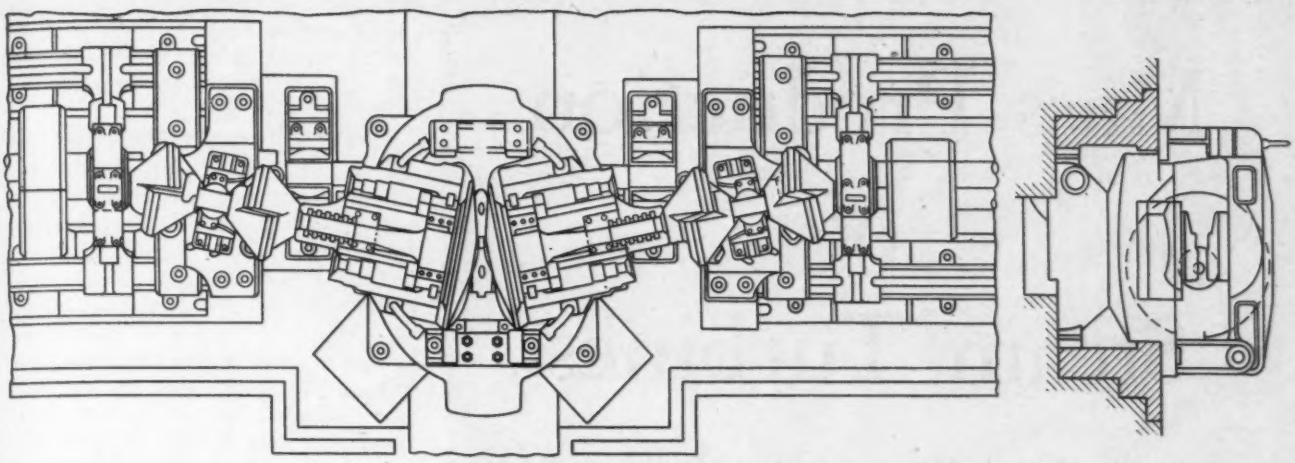


FIG. 13—Complex disk mill built in 1890. The rolls could be adjusted to any required angle.

possible and, simultaneously, to enlarge its diameter.

One of the reasons for the many failures at the time was the lack of suitable furnaces and the inability to heat the stock uniformly to the required temperature. Again and again the furnaces were rebuilt.

And there was still the old trouble of the bending of the piercer rods to be overcome, particularly of the longer ones; in other words, the difficulty of centering the piercing point accurately had still to be met. Failures and inabilities of this kind eventually compelled the inventors to set aside this process at that time.

It was much later that one reverted to this process. This was upon the first successful piercing operation by means of the Pilger step process, and after the piercing point had been mounted—as a kind of third, internal roll—on a hanging piercer rod, which was only exposed to tension stresses, thus replacing a supporting rod exposed to compression and bending.

This improved arrangement removed the main source of all difficulties. A similar disk type mill illustrated in Fig. 35, is now employed by the largest, up-to-date, tube expansion mills turning out pipes up to 60 in. in diameter.

Ed. Note: Next week the invention of the Pilger step mill and its subsequent improvements as well as welding and shaping procedures are described.

Effect of Lead on Manganese-Molybdenum Steel

A COMPREHENSIVE study of material from two ingots of manganese-molybdenum steel, to one of which 0.19 per cent lead was added, was recently completed by T. Swinden, United Steel Co.'s, Ltd., Stocksbridge, England, and presented to the British Iron and Steel Institute.

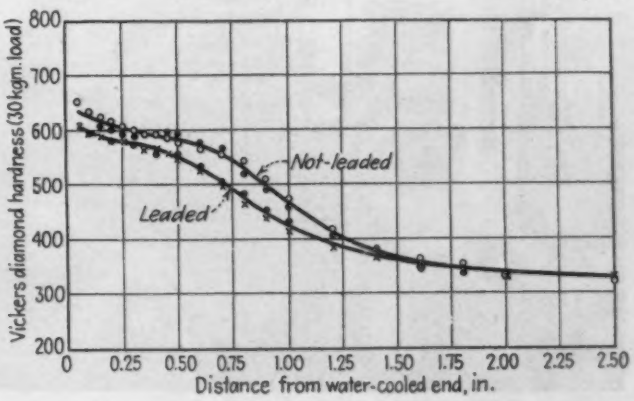
The leaded steel had a slightly coarser inherent grain size and less depth hardenability than the non-leaded steel, as indicated by the chart of Jominy end quench results, shown in the accompanying graph. The properties measured in the tensile test at room temperature were similar for the two steels in the form of flat and round bars. The notched-bar impact toughness of the leaded steel at room temperature was rather less than that of the non-leaded steel.

At elevated temperatures, the maximum-stress values of both steels were similar, but the ductility, as measured by elongation and reduction of area, was lower in the case of the leaded steel, particularly in the transverse direction. The Izod impact values of the leaded steel also were lower at elevated temperatures.

The Barr-Blodgett creep-stress values of the two steels at 930 deg. F. were identical, while no significant difference was shown by the figures for damping capacity.

When treated to a tensile strength of 65 tons per sq. in., the fatigue ratio and notch sensitivity (rotary bending) of the two steels were similar. When treated to the lower tensile strength of about 55 tons per sq. in., the non-leaded steel had a higher fatigue ratio (rotating cantilever) and slightly greater notch sensitivity than the leaded steel. The fatigue ratio (direct stress) of the non-leaded steel compared with the leaded steel was slightly higher when treated to 65 tons per sq. in. and slightly lower when treated to about 55 tons per sq. in.

The leaded steel has a 38 per cent better machinability than the non-leaded steel when the steels are treated to 57 and 65 tons per sq. in. tensile strength as judged by the standard Losenhausen test.



JOMINY end-quench hardenability test results on leaded (0.19 per cent) and non-leaded manganese-molybdenum steel, normalized at 1580 deg. F. and quenched by water at 60 deg. F.

Mass Production of Steam Turbines

. . . Ordinarily, steam turbines are tailor made and are therefore produced in glorified job shops. At the Erie Works of General Electric where propulsion units for Maritime Commission ships are built, the quantities involved of one size are such that repetitive manufacturing techniques are possible. Some of the more interesting machining operations and special purpose equipment installed are described and illustrated in the accompanying article.

ELEVEN million horsepower of propulsion turbines this year, and in the three years 1942-1944 three-quarters the horsepower equivalent of all steam turbines built by the company for both land and sea use in the preceding 40 years—that is a quick factual picture of the enormous increase in turbine production at General Electric.

Manufacturing facilities were greatly enlarged to do the job. New plants built for turbine manufacture were set up for straightline, repetitive production as opposed to the customary turbine manufacturing layout, which is essentially a job shop. This was possible because only relatively few ratings of propulsion turbines are being built in large quantity. In peacetime the typical turbine shop is required to produce units in a wide assortment of ratings, an assignment not conducive to repetitive manufacture.

One of the company's typical new turbine manufacturing plants is located at its Erie Works where main propulsion turbines for two types of cargo vessels are produced in quantity.

Production was started at the new Erie plant with a nucleus shop organization of 20 skilled mechanics from turbine shops at others of the company's works and a force of workers, 90 per cent of whom were unskilled. The unskilled workers, mostly men but some women, were recruited from shops producing peacetime products which had shut down with the war and lack of materials. The majority of those workers with previous industrial experience had been on regular line production, consisting chiefly of assembly operations. Few had any contact with jobs requiring mechanical skill. Each worker therefore was assigned to learn *one* operation by observing and helping a trained man. In an average of 12 weeks' time, the new worker could take over

INSIDE of low-pressure casing being machined on 16-ft. vertical boring mill. The job is speeded about 20 per cent due to reduced overhang on the boring bar when the high-pressure end is not a part of the casting shown.

the job and in many cases the new worker actually developed superior skill on the one particular operation he was trained to perform.

Suggestions from Workers

One interesting result of the familiarity each worker acquires with his particular job, incidentally, is the large number of suggestions turned in for improving jobs. This has had a cumulative effect in helping to speed production.

In the shop's first year of operation, for example, 180 of the suggestions turned in by workers were adopted. The employees were paid for their suggestions according to the merit of their ideas, which related to all phases of turbine production. For instance, a ring-type jig suggested by a worker proved to be a real time-saver. The same worker suggested a very unusual method of holding a heater inside turbine shells on an adjustable stand.

Another worker suggested a means of eliminating excessive grinding by altering the contour of a casting. By another suggestion he eliminated a large amount of straightening necessary on certain types of bar stock. A substantial amount was paid to another worker for suggesting a change in specifications and routing of orders which saved time and material and assured that important parts would be available when they were needed.

At Erie the propulsion unit for each merchant ship requires two turbines, a high-pressure and a low-pressure machine. Approximately 5500 parts are matched up in 50 subassemblies. Practically every type machining operation is represented in their manufacture, and the operating efficiency required of a turbine demands that the parts be machined to exacting tolerances and assembled with infinite care. Following are some of the steps in machining the casing, rotor, buckets and diaphragm assemblies for the low pressure turbine in which repetitive manufacturing techniques have been applied.

The Casing

The casing for the turbine is received as a rough casting in two pieces, an upper and a lower half. The flanges of these pieces must be rough and finish planed to assure a tight fit, and properly drilled and doweled for bolting. Machining the inside of the casing is done with the two halves bolted together on a 16-ft. vertical boring mill. In this operation, grooves are cut into which the turbine's diaphragm assemblies will be fitted.

By machining the high-pressure head of the casing as a separate unit, considerable time and effort is saved. The job is done on an 8-ft. boring mill, and the 16-ft. mills that would be required if the heads were machined as a unit are thus available exclusively for the larger castings. Because overhang on the boring bar of the 16-ft. mills is reduced by not having to machine the high-pressure head, the job of machining the low-pressure casing is speeded up about 20 per cent. Moreover, machining of the high-pressure head itself is speeded up from 20 to 30 per cent because it is worked open and is therefore more accessible to the tool.

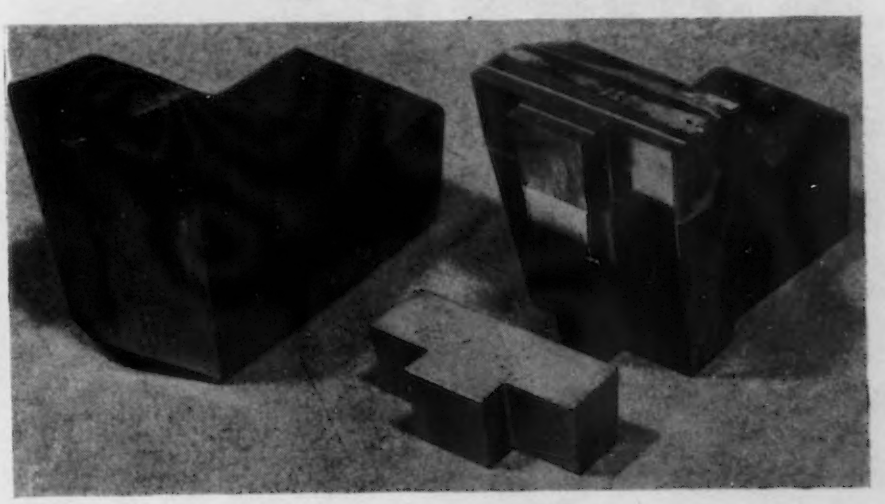
IN "opening" the rotor or turbine stages from a solid forging, the lathe is run backwards and the special carbide tipped tool is held to cut from below so the chips fall by gravity. Note the special type of holder required to support the tool in these deep slots.

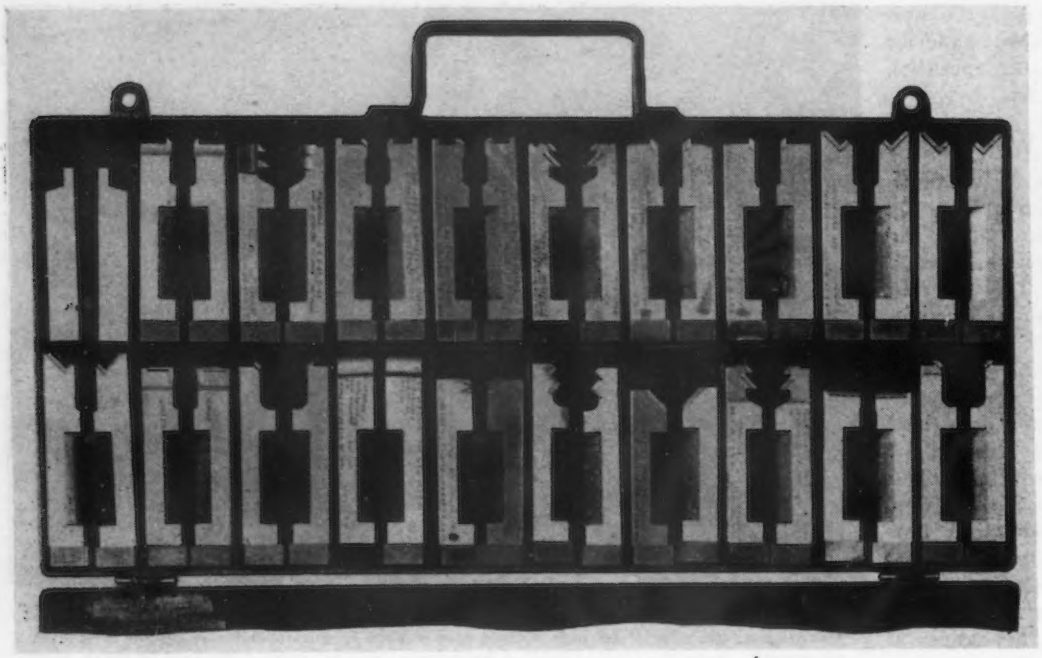
Machining the Rotor

The rotor must be precisely machined so that the bucket blades can be assembled to it securely. It is received as a rough-turned forging weighing about 21,550 lb. A series of cuts are made into its diameter so that the required number of wheels for mounting the bucket blades are formed on the shaft. Each bucket wheel and diaphragm assembly positioned immediately ahead of it constitute a "stage" in the turbine.

Opening up the solid rotor forging to form the bucket blade wheels is typical of the machining operations which have been speeded through the use of Carboloy cemented carbide tools. Carbide tipped tools are used almost exclusively for roughing and semi-finishing the rotors. A tool 1½-in. wide with three cutting edges is used for opening the rotor, an operation in which about 10,000 lb. of metal

CARBIDE tipped tool with three cutting edges (right) compared with high speed steel V-tool (left) previously used to open rotor. The carbide tipped tool has speeded rough cutting about 300 per cent.





ABOVE

SET of high speed forming tools for cutting dovetails in rims of bucket wheels. Operator follows a blueprint which shows sequence of tools and depth of cuts.

o o o

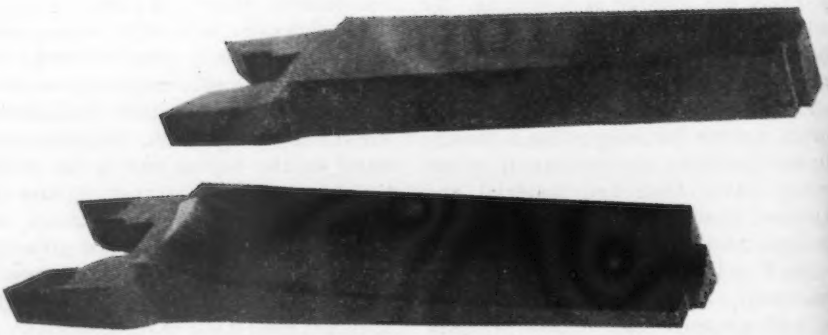
RIGHT

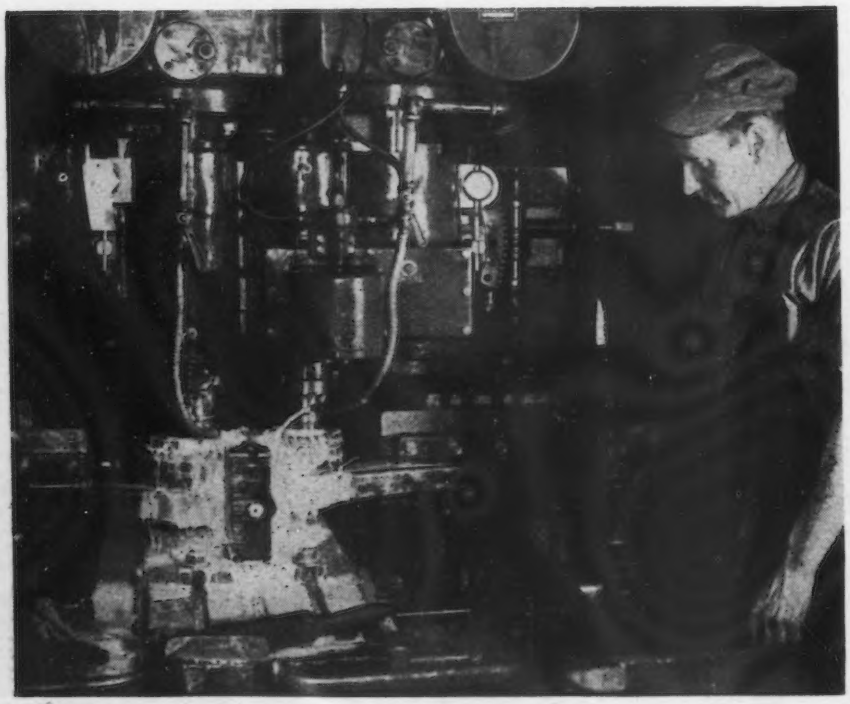
CLOSE-UP of two buckets before and after a compound cut is made in the face. Back of the blade will be similarly curved on a special purpose milling machine.

o o o

BELOW

ONE of the special purpose milling machines used for multiple cutting buckets.





are removed. The tool is designed to break the chip into three equal parts, which allows the tool to cut just about as free in parting the metal as would be possible on a facing operation. A feed of 0.012 to 0.018 in. at 18 to 23 r.p.m is used, providing a peripheral speed range of from 175 to 250 ft. a min. Rotation of the work is unconventional in that it is turned backwards and the tool is mounted with the cutting edge down so that the chips fall free instead of piling up on the tool and its mounting post. The special carbide tipped tool has speeded up the rough cutting operation about 300 per cent as compared to the best speed using a tool of super-cobalt high speed steel.

Before and after final machining, the rotor is subjected to a heat stabilization test and cure which gives it permanent straightness. To accomplish this, it is mounted in a standard lathe bed, a sectionalized electric oven is closed about it and controlled heat is applied through strip heaters on the wall of the oven. The rotor is turned at 2 r.p.m. and thermocouples riding on it give temperature readings which are observed and recorded hourly for from 24 to 48 hr. As the oven heat is raised, the rotor loses its straightness. Sliding rods passed through the wall and riding against the turning rotor indicate increasing shaft deflection as the temperature goes up. Then at a certain critical point considerably above the operating temperature of the turbine (770 deg.

o o o

RIGHT

DUPLEX milling machine for diaphragm blades. Stock is pushed through from one side and pulled from the other, moving across the tops of the two cutters so that chips fall by gravity.

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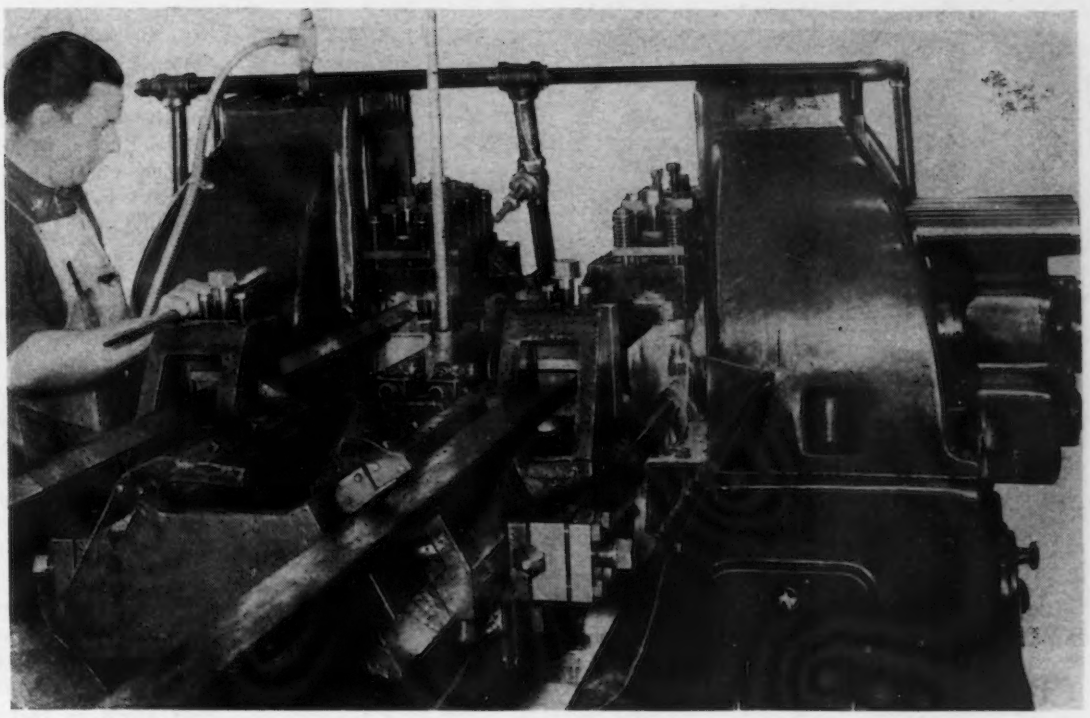
BELOW

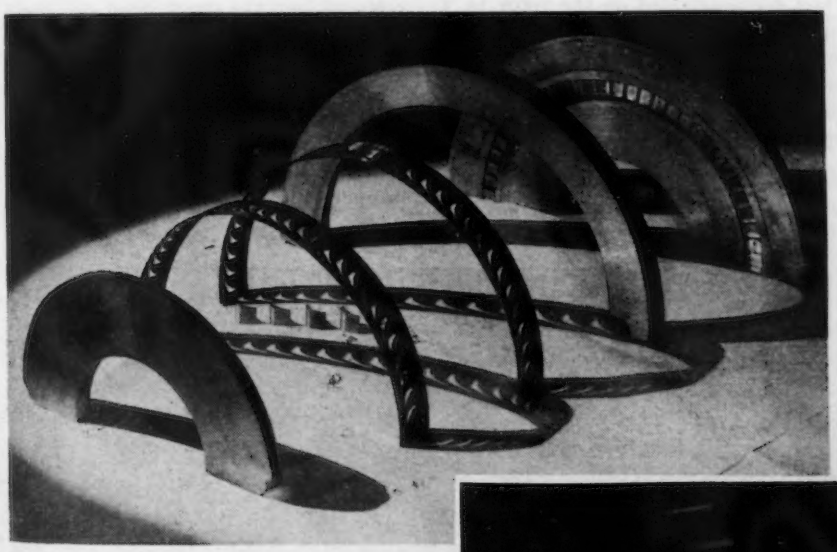
PARTS for welded fabricated diaphragm. Completed half diaphragm at rear.



F.), straightness is restored that is not affected by subsequent temperature changes.

A specially built 38-in. lathe equipped with extended cross slides to accommodate 13 in. of travel is used to finish the sides of the wheels. This adaptation eliminates tool setting that would otherwise be necessary on a regular lathe of this size.

The outer rim of each wheel of the rotor is given a serrated cut to provide a dovetail fit for the bucket blades. Previously, this operation was one which called for the highest degree of skill and experience to work to the close tolerances required. By special tooling (see photograph), the job can now be done with small possibility of error by an operator with as little as four weeks' training. A set of high speed steel forming tools is used in sequence to make the dovetail on each wheel. The operator follows a blueprint which specifies the correct tool for each cut and the depth of cut in each case. A hardened and ground tool holder is used and position of the tools in relation to stops on the holder is checked by gages to prevent possibility of a cut being made with a tool out of position.



Bucket Blades

More than 2500 bucket blades are mounted on the rotor. They are of corrosion resistant, chrome stainless steel, machined from square or rectangular stock in a series of straight-line operations. Most of the machining operations are performed on special purpose milling machines. A great deal of time is saved by multiple cutting wherever possible. For example, the dovetail and tenon of the

DIAPHRAGMS blades being assembled in holes punched in inner and outer spacers.

OUTER band, spacers with diaphragm blades, and inner-ring are arc welded on a positioner to form a half diaphragm.

buckets are cut on a special-purpose machine which handles a load of eight at one time. Another single-purpose unit climbmills the steam passage in the bucket, with the cuts held within 0.001 in. of being on center and 0.001 in. of being on radius. Proper contour of the face of the bucket is obtained by making a compound cut, and a special-purpose miller obtains a curvature of the dovetail which will exactly fit the serrated rim of the wheel.

All buckets are Magnafluxed after they are finish machined to detect any cracks or flaws that may be present. They are assembled on the rotor by a machine which secures them with a press fit, and locking pieces are used to hold them firmly in place. Shroud bands riveted by hand encircle the tips of the buckets and complete the turbine wheel. When all the turbine wheels on the rotor are thus completed, the rotor is mounted in a specially designed 60-in. lathe and the shroud bands are turned to the proper dimensions. Then the rotor is dynamically balanced and is ready for assembly in the turbine.

Diaphragm Assemblies

Blades for the diaphragm sections are machined on two duplex milling machines equipped with a special draw fixture devised by one of the Erie Works' tool engineers. One machine is used for roughing and the other for finishing. They are identical except for the gripping and locating pads. Each mill has two independently operated driving screws. Because of the large stock removal, the bar stock, which comes in 14 or 16 ft. lengths, is moved across the top of the milling cutter so the chips will fall clear of the machined surface. The bar stock is fastened in a pushing head and entered through guide pads into the cutter. After sufficient length has been milled, the drawing head, which is traversed by the same screw as the pushing head, is clamped about the mill stock. The push head is then released and the draw head continues to pull the stock past the cutter until the full length of the bar has been machined. This method of changing clamping on the piece does not change the feed of the piece at any time. The rough milling cutter is fed at 2 3/16 in. per min., which obtains a stock

COMPLETED turbines on test, after which the machines will soon be on their way to shipyard for installation in merchant ships. Note the use of women on test work.

removal of 2.08 cu. in. per min. on the outside and 1.212 cu. in. on the inside. An average of 1/64 in. is allowed for the subsequent finishing operation.

The blades are sawed to their proper lengths on an automatic saw, polished and then assembled in inner and outer spacer bands. The spacer bands are made of cold drawn steel which has been indexed punched and rolled to receive the nozzle blades. The nozzle blades and spacer bands are tack welded.

Assembly Operation

Meantime, the inner and outer rings for the diaphragm assembly have been prefabricated and all three parts—bands, spacers and rings—arc welded to form a complete half diaphragm. One half of the diaphragm assembly for each stage goes into the upper part of the casing of the turbine and the other half into the lower part.

The lower half of the casing is set up on the floor plate and leveled. Then the reverse end bearing bracket and the high-pressure head end bearing bracket are positioned in the lower half casing. A line bar with an indicator on it is inserted between the bearings to check the diaphragm with the bearings as well as the bearing centers. The diaphragm halves are assembled in the upper and lower halves of the casing, and the rotor is positioned in the lower half of the casing. Clearance between the shroud bands and diaphragms is checked and also between the shroud bands and nozzles and the intermediate diaphragm.

Next, the packing, a metallic ring, is placed in the diaphragms and checked for clearance. Thrust plates, which preset and maintain the position of the rotor, are assembled and the top half of the casing is lowered into position and bolted up. The oil pump is then installed inside the reverse end bearing bracket, and the turbine is ready for the test.

The test is free running and vibration is checked at maximum operating speed. The machine is given its acceptance run in the presence of representatives of the American Bureau of Shipping. After the test the top half of the turbine is removed and inspected, and the rotor and the inside of the diaphragm is flushed with a rust preventative. The complete tests require about a week, after which the turbine is prepared for shipment for installation in a merchant ship as the prime mover of a geared-turbine propulsion set.

Large Gate Valve Built by Arc Welding

By JOHN H. HINKLE

DUE to changes in operating requirements at the Keystone Ordnance Works, Geneva, Pa., it was found that a 30-in. gate valve was required promptly to permit completion of the construction work. The Fraser-Brace Engineering Co., designers and contractors for the plant, was unable to secure delivery of such a valve from regular sources of supply in less than ten months. As it was impossible to delay the job this long, it was decided to construct the valve on the spot. The valve was designed by H. F. Lenz of the Shenango Construction Co. and J. H. MacLauchlan of Fraser-Brace in such a manner that it was practical to build the valve with the limited equipment available in the construction shops.

The valve was constructed by the steam-fitters in the pipe shop under the direction of the author, assisted by mechanics in the machine shop under the direction of John Terrill. The valve was made entirely of stock materials available on the project, a great portion of which could be classified as scrap.

A section of 30 in. pipe was cut at the proper angle to form the wedge and the ends of the same piece of pipe were used to form a base for the seats and flanges. Steel plates were cut to form the sides of the wedge and faces were formed by building up with bronze welding rod on the plates and then machining. The plates were then arc welded to the wedge section of the 30 in. pipe to form the complete gate. A steel block, made up of plates arc welded together, was then welded to the top of the gate to form the base for the bronze adjusting nut. The adjusting nut also was built up by arc welding, using bronze welding electrodes, and was then machined. The seats were formed of steel plate with faces built up of bronze welding rod and then machined.

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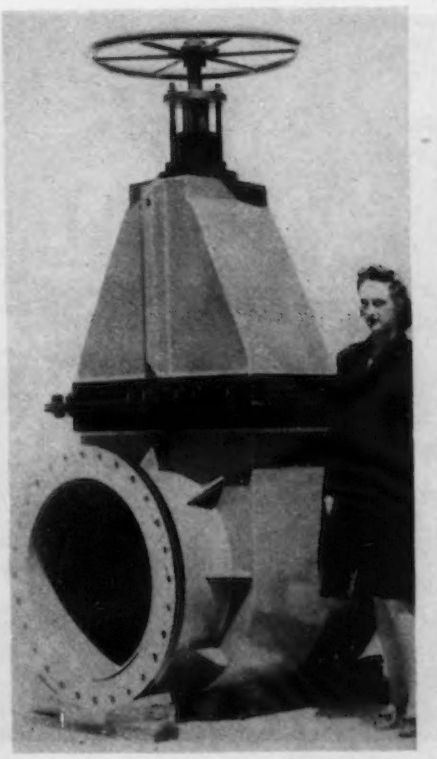
THIS large gate valve was fabricated in three weeks' time by arc welding scrap pipe plate and structural shapes.

Photo courtesy of Hobart Brothers, Troy, Ohio.



As no lathe was available large enough to machine the faces of the gate and seats, it was necessary to raise the head stock of an 18-in. lathe to accommodate the larger diameter work.

The valve stem was turned from two sections of broken shafting arc welded together at the collar, while the stuffing box was formed from steel blocks fitted with bolts, washers and flanges. Similarly, the body and bonnet were formed of steel plate arc welded together and reinforced by structural shapes. The wheel was formed of steel pipe bent to shape with spokes arc welded to the hub and rim.

The entire valve was fabricated in three weeks' time and the cost was approximately that of a factory made valve of equal size. The total height of the valve was 9½ ft. and the weight approximately 5000 lb.

Gas Pipelines Increase Welder Productivity

By R. W. STEWART
Installation Specialist, Applied Engineering Dept., Air Reduction Sales Co., New York

. . . The author describes a recent installation made at the Bell Aircraft plant in Buffalo and cites the savings in floor space and cost of distribution obtained by the use of central gas dispensing stations with pipe lines to individual work benches, replacing cumbersome cylinders.

THE advantages of piping oxygen, acetylene and hydrogen for welding in aircraft plants, replacing the individual cylinder method of supply, can very aptly be compared to distributing water via a plumbing system instead of by carrying it in buckets. When consumption becomes large and the number of service points becomes great, pipelines provide the obvious escape from an unwieldy and costly cylinder handling problem. They also introduce a significant improvement in the safety factor, as well as a saving of floor space.

How these factors may be expected to work out in actuality will be shown by an examination of the gas distributing system recently installed by Air Reduction in the Buffalo plant of Bell Aircraft Corp. Among aircraft fabricating plants, this factory is one of the few which have complete piping and control systems for all three gases. Due to rapid expansion of this company's operations, floor space was at a premium and the saving in this respect alone, gained by removing cylinders from work benches, justified the cost of the installation.

Costs Analyzed

More important than space, however, are the savings in manhours. Prior to the installation of the gas

FIG. 1—This view of the welding area before pipelines were installed at Bell Aircraft Corp. shows the great number of space-wasting cylinders which needed frequent replacement.

FIG. 2—Unobstructed by cylinders, the welding department is now compact, with three gases piped to left and center benches, two gases to right hand row.

pipelines, this plant had an average of 550 gas cylinders on the premises at all times, some in stores and some distributed around the floor. Approximately 100 cylinders were handled each day. It had been observed that work was interrupted for about ½ hr. to replace an empty cylinder with a full one. The cost and time loss involved in this operation was variable. Male welders disconnected cylinders themselves, rolling them to a side wall where a number of fresh cylinders were stored, bringing one of these back and attaching a pressure regulator to it. In this case the cost was ½ hr. of non-productive working time and approximately 50c. labor cost for this time.

Female welders, however, called upon a full-time cylinder handler to make the change for them. In these instances the cost included this handler's labor time as well as that of the woman welder. Each welding bench had three cylinders standing beside it, and on an average each cylinder became exhausted during the third 8-hr. shift it was in service.

As mentioned above, this system required the full-time services of one man to maintain a reserve of 10 cylinders of the gases at the side of the welding area, as well as to deliver cylinders to other areas throughout the plant where welding or gas cutting were done. These cylinders were brought up from a storeroom at the far end of the plant.

Entirely apart from the time and money costs already described, there were additional costs in handling and checking cylinders at the stores and delivery room. The most time-consuming element here was the bookkeeping task of tallying the serial numbers of 100 incoming and outgoing cylinders per day. Adding to this the labor time for actually handling the cylinders, together with the transport and installation costs mentioned previously, brings an overall figure of approximately 45 min. per cylinder, at a cost of roughly 75c.

Floor Space Saved

The second item of consideration is that of floor space. While the importance of this factor varies from one plant to another, the highly compact arrangement of departments at Bell Aircraft made space saving a prime consideration. This can be illustrated by brief description of conditions "before and after" at two work points. Fig. 1 shows the general welding area before pipelines were installed. Close scrutiny of this photo reveals the clutter of gas cylinders, six to each bench, eleven benches in a row. Elimination of these cylinders enabled the entire welding area to be rearranged in the compressed but not congested layout shown in Fig. 2. With the cylinders taken out, 1 ft. of additional space was made available between benches and the benches were moved closer together, freezing a total of almost 600 sq. ft. of floor space. Not only was space reclaimed but the factor of floor clearance was obtained. A much neater and less hazardous arrangement is presented with the elimination of the numerous clusters of cylinders.

This element of floor clearance was made evident in numerous other areas throughout the plant, where it had been customary to find cylinders or portable cylinder trucks standing near work points in many departments. These are now replaced by simple pipeline drops with regulator outlets against the walls or roof columns. A conspicuous example of this newly-acquired simplicity is the station drop shown in Fig. 3. This outlet serves a four-torch Oxygraph cutting machine. It replaces a bank of 20 to 25 manifolded oxygen and acetylene cylinders which formerly stood near the machine, with several of the cylinders standing idly in reserve to re-

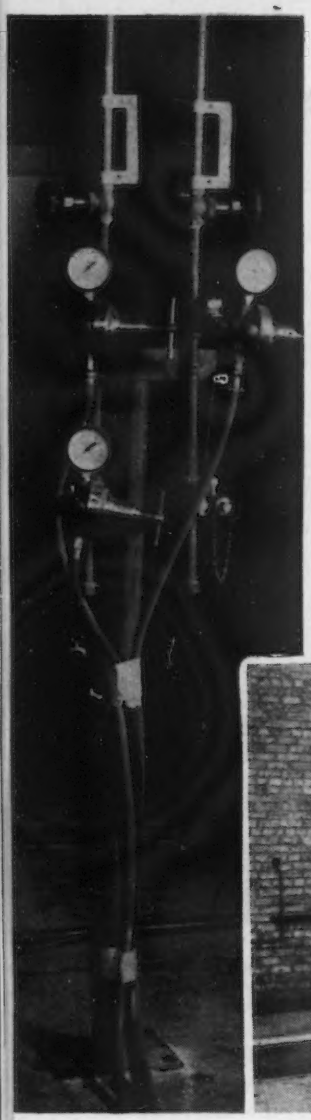


FIG. 3—This simple station drop replaces a bank of 20 oxygen and acetylene cylinders which formerly were needed for the Oxygraph cutting machine.

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the "in reserve" trailer is connected in the same way, with valves set so that it will cut into the line automatically when the shop line pressure drops below 75 lb. as the first trailer becomes depleted. The changeover is accomplished smoothly and automatically without need for operator attention.

This automatic switching prevents line pressures from falling below the acetylene line pressure; if this occurred, it might permit acetylene to creep into the oxygen lines and form explosive gas mixtures. The low pressure piping system further promotes safety by completely eliminating the presence in the shops of gases held under high pressure. From the point of entry into the plant to the point of use, the gas is never under more than 75 lb. pressure. This level is higher than necessary for the welding operations, but is required for cutting on the Oxygraph machine. Without the machine, a pressure of 25 lb. would be adequate.

A final safety device included in the oxygen line is a relief valve between the master regulator and the distributing system. This is set to relieve excessive pressures forming in the line, in the remote event of failure of the master regulator.

Acetylene and Hydrogen Supply

Acetylene and hydrogen originate in the same building, the former be-

LEFT

FIG. 4—This typical standard installation illustrates the method of oxygen delivery. One trailer of this type will provide sufficient oxygen for supplying all plant needs for three to four days.

o o o

BELOW

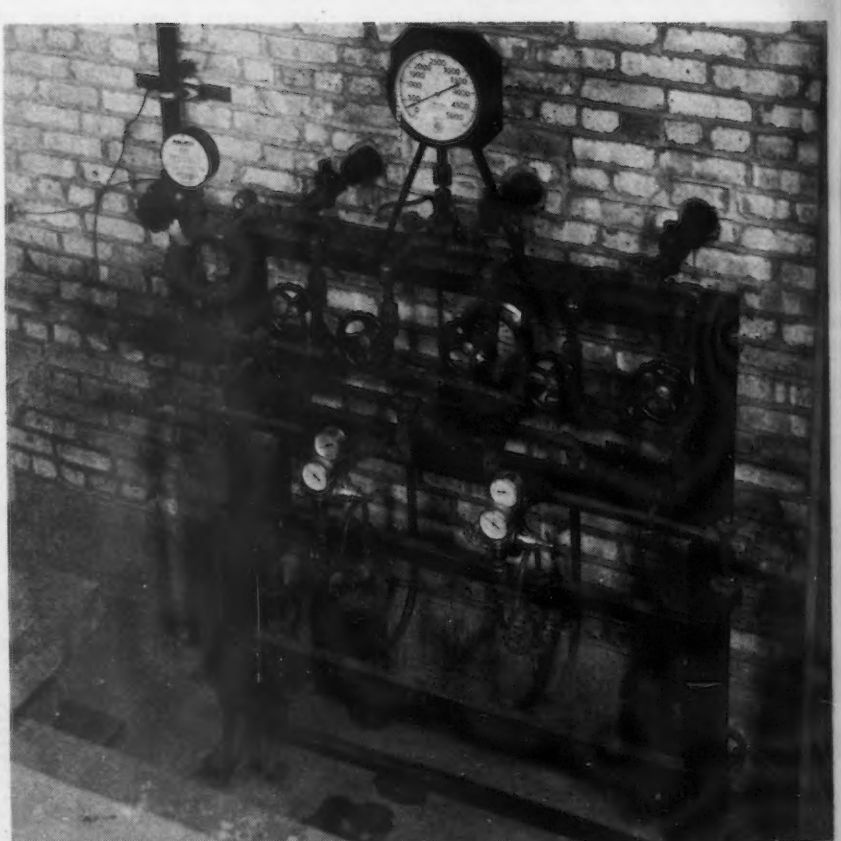
FIG. 5—Oxygen master control valves and pressure regulators. These provide automatic switching from one oxygen trailer to another.

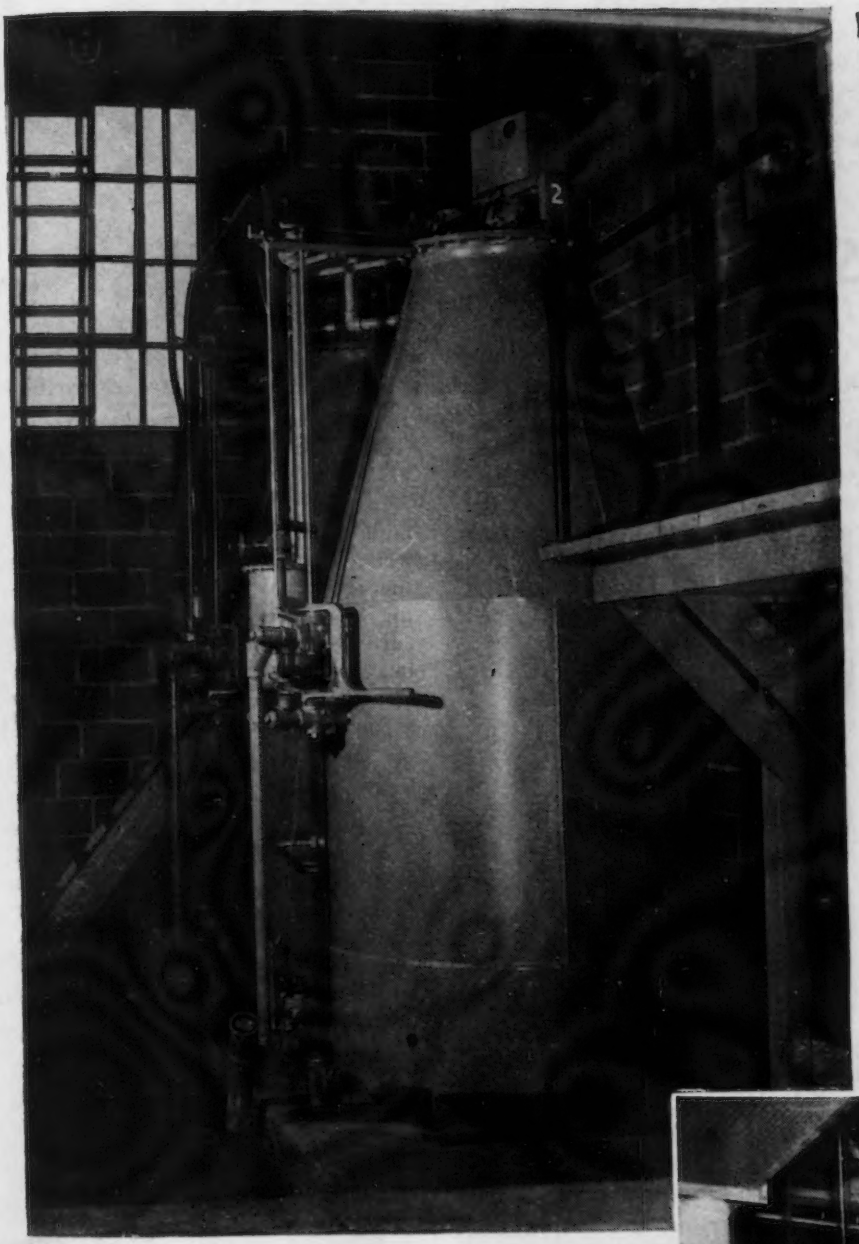
place exhausted cylinders on the manifold.

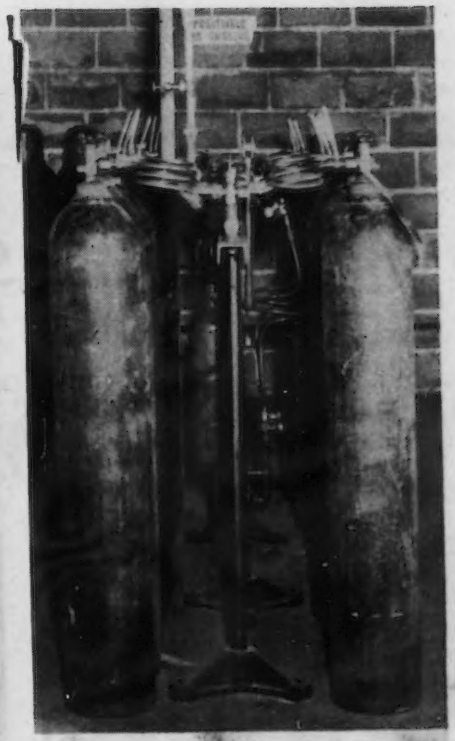
The factor of increased safety represents the third major advantage of the gas distribution and control system as compared to the individual cylinder method of supply. All three gases—oxygen, acetylene and hydrogen—originate in a separate, fence-enclosed building. In front of this building is a parking space with gooseneck connecting pipes for three oxygen trailer trucks, each carrying 10,000 cu. ft. of gas. Usually only two trailers, similar to the typical installation in Fig. 4, are parked at one time, one in service and the other standing by. Each trailer carries enough gas to supply all plant needs for 3 to 4 days.

Oxygen Trailer Service

The "in service" oxygen trailer, having an initial gas pressure of 2400 lb. per sq. ft., is connected to the master valve control or "switching" unit, Fig. 5, which directs the gas to a master regulator where the pressure is reduced to 75 lb. for direct distribution to the lines. At the same time







ABOVE

FIG. 7—Hydrogen for all plant needs is provided by this double-bank manifold. Regulators switch automatically from one bank to the other as the first becomes depleted.

ing generated on the spot by two 500 lb. double-rated generators, shown in Fig. 6, each capable of delivering 1000 cu. ft. of acetylene per hr. Only one generator is in service at a time, delivering filtered acetylene gas to the lines at a pressure of about 10 psi. A single charge of each generator usually lasts 36 to 40 hr.

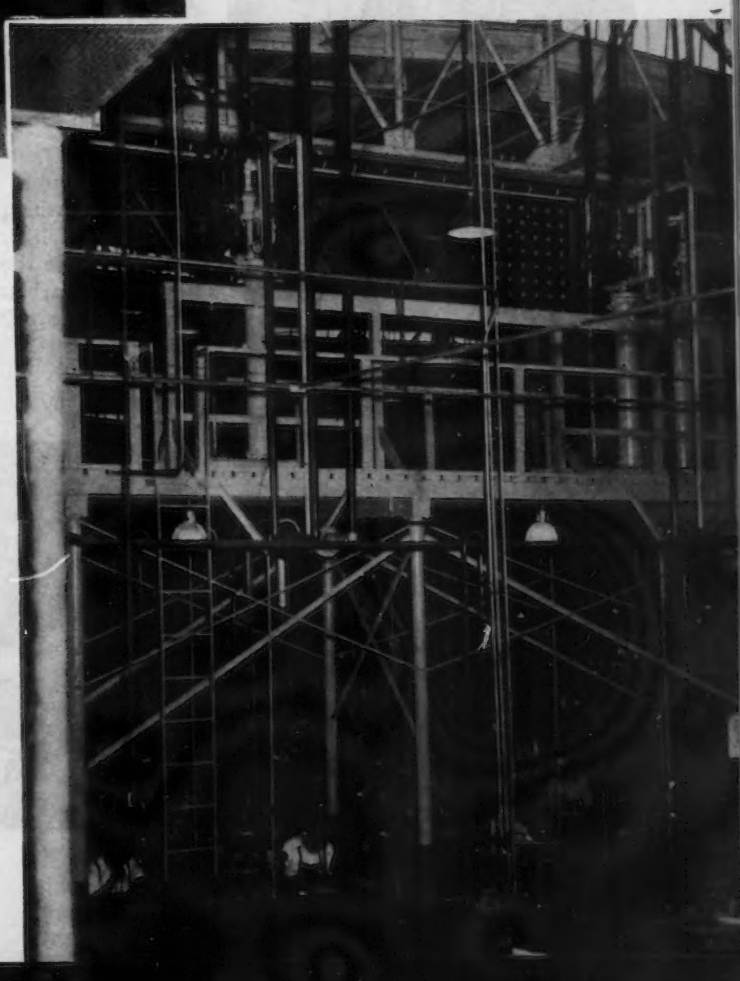
Hydrogen is provided by a double-bank cylinder manifold having 10 cylinders on each side, Fig. 7. As with the oxygen trailers, each side of the manifold is alternately in service or in reserve, with automatic switching from one bank to the other. Manifold regulators deliver the hydrogen gas to the lines at pressures of 10 to 12 lb. On an average, each bank supplies gas for 24 hr. before exhaustion, thus requiring a total of only 70 cylinders per week.

Both the acetylene and the hydro-

(CONTINUED ON PAGE 140)

ABOVE

FIG. 6—Acetylene is produced by these two 500-lb. generators. Space is available for a third, should it be needed later.



RIGHT

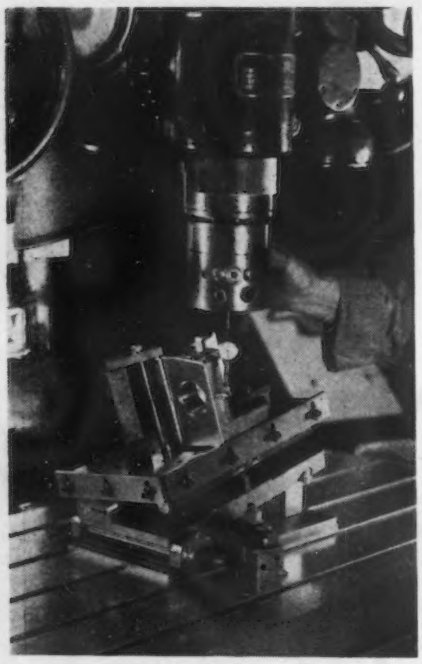
FIG. 8—Protective waterseals for acetylene and hydrogen are mounted atop this platform at end of welding department.

New Equipment . . .

Gages and Small Tools

. . . Recent developments in gages, vises, measuring devices portable pneumatic tools and machine tool accessories are described in the following pages.

A METHOD of quickly securing accurate angular setups for jig boring has been devised by the use of the sine plate manufactured by *Robbins Engineering Co.*, 318 Midland Avenue, Detroit. It is adjusted



to the required angle, either single or compound, by the use of standard gage blocks. The work can then be attached to the plate with no possibility of slipping during the boring operation. Being non-magnetic, it is not dependent on electric current being available.

Visual Inspection

A VAPOR proof model of Super Sight, manufactured by the *Boyer Campbell Co.*, 6540 St. Antoine Street, Detroit, for visual inspection of vital war parts, is said to improve efficiency of inspection, reduce hazard and relieve eye strain. It may be equipped with brackets adaptable to

precision machining of any kind of machine tool. Double lens equipment may also be provided where still greater magnification is required.

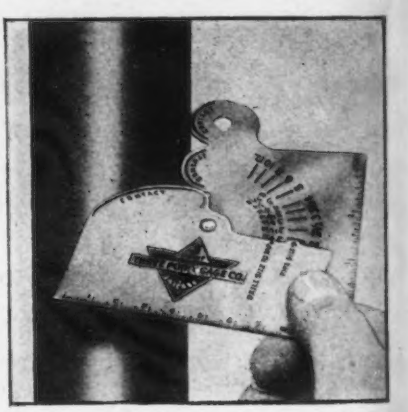
Gage Blocks

THE Lincoln Park Tool & Gage Co., Lincoln Park 25, Mich., is producing carbide gage blocks, called Carblox, which provide the means to greatly reduce the wear error in gage block use. Carblox used on each end of a build-up will act as protective anvils and prevent wear on the less wear-resistant steel blocks. They are practically non-magnetic, and their

high cohesive factor facilitates the wringing of thin blocks and eliminates the difficulties encountered in wringing thin steel blocks. They can be furnished to "A" accuracy (0.000004 in.) or "B" accuracy (0.000008 in.) as a series of a gage block build-up or as individual blocks.

Pipe Gage

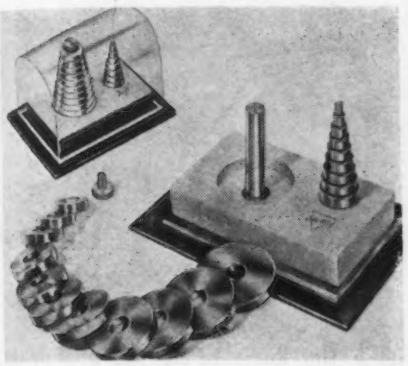
A POCKET size pipe gage for instantaneous measurement of all sizes of pipe from ⅛ to 12 in. has been announced by the *Three-Point Gage Co.*, 3821 Broadway, Chicago. It consists of two pivoted steel plates with edges curved at three points for



contact with the pipe to be measured, together with scale which automatically registers not only the pipe size in terms of inside diameter but the drill size for tapping.

Master Gages

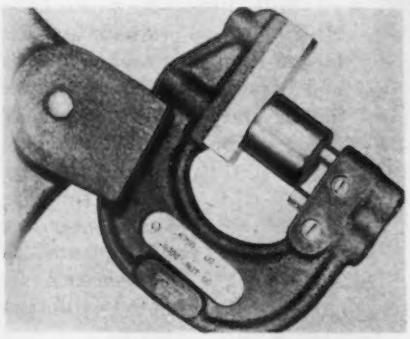
A SET of master setting and checking rolls for the checking of micrometers and other precision inspection and gaging instruments has been put on the market by *Sav-Way Industries*, 4875 East 8 Mile Road, Detroit. The set consists of 20 individual rolls ranging from 0.100 to 2 in. in diam. The rolls are hardened,



ground and lapped to gage makers' X tolerance. They are deep frozen before finish grinding to eliminate internal strains and provide accelerated aging. The set is housed in a modern transparent plastic case.

Snap Gage

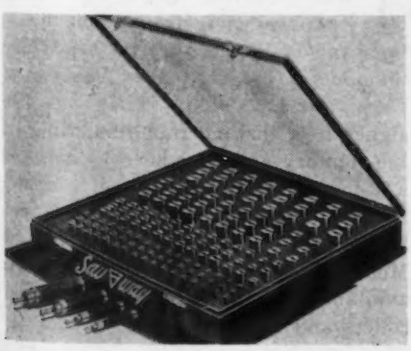
FOR quicker inspection of precision parts, the *Greenfield Tap & Die Corp.*, Greenfield, Mass., offers its No. 1618 rapid inspection limit snap gage. It features an extended lower anvil,



which facilitates inspection because the work may be readily located and leveled. It measures diameters of round parts and gages external lengths.

Plug Gages

SAV-WAY INDUSTRIES, 4875 East 8 Mile Road, Detroit 13, has announced a new master set of standard plug gages for hole inspecting, which consists of 147 plugs and four handles in a plastic case with



a transparent plastic cover. Plugs are set in increments of 1/64 in., from ¼ to 1 in. There are three plugs of each nominal size: 0.0005 over, standard, and 0.0005 under. All plugs are deep-frozen before finish grinding to relieve internal strain and provide accelerated aging, and are held to gage makers' (X) tolerance, lap finish.

Ball Joint Vise

BY matching the ball joint vertical degree graduations with the horizontal degree graduations required, settings are quickly obtained on the

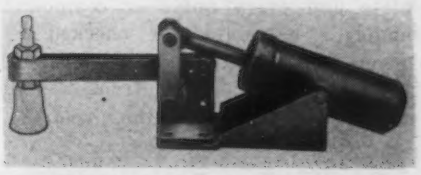
universal ball joint vise put on the market by the *Wall-Colmonoy Corp.*, 720 Fisher Building, Detroit. The vise can be rigidly locked through a 30-deg. arc in a horizontal plane. It is recommended for holding cutting tools while grinding chip breakers and curlers at predetermined angles.

All-Angle Vise

THE Hilco all-angle "Driv-Wheel Movement" vise with three protractor dials for horizontal, vertical and diagonal settings is announced by the *Berco Mfg. Co.*, 429 West Superior Street, Chicago. Features include a patented drive wheel movement which gives 2¾ in. lateral clearance, double swivel construction, right angle clearance, and positive horizontal setting for highest 180 deg. accuracy. It is available in 3½, 4½ and 6-in. jaw widths.

Toggle Clamp Activator

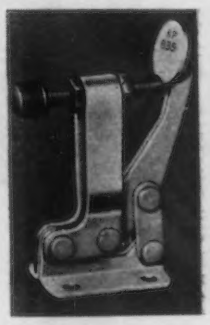
A DEVICE designed for activating toggle clamps has been developed by *Airop, Inc.*, Dearborn, Mich., to hold down large parts or assemblies where clamps would be required to encircle a job, such as in the case of airplane wings. A gang of



Airops placed around an extensive perimeter can be controlled from one central pneumatic control valve and all the clamps made to operate simultaneously or at staggered intervals. A pivoted cast metal cylinder houses a plunger connected with a toggle clamp, which does the actual holding, not the air cylinder. It operates on 40 to 150 lb. pressure.

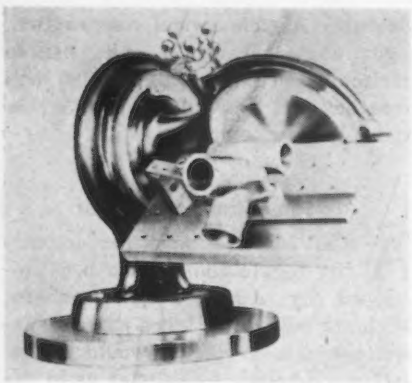
Horizontal Type Toggle Clamp

MODEL KP 835 horizontal type toggle clamp has been put on the market by *Knu-Vise, Inc.*, Hamilton and Grove Ave., Detroit. A U-shaped bar provides for the horizontal positioning of the pressure spindle and permits the clamping of work of varied thicknesses. The clamp measures 6 in. in length when closed, and the spindle has an adjustment range of 1¾ in. horizontally within the channel of the U-bar. The clamping action of the handle will multiple to a pressure of 550 lb. at the pressure contact.



Angle Computer

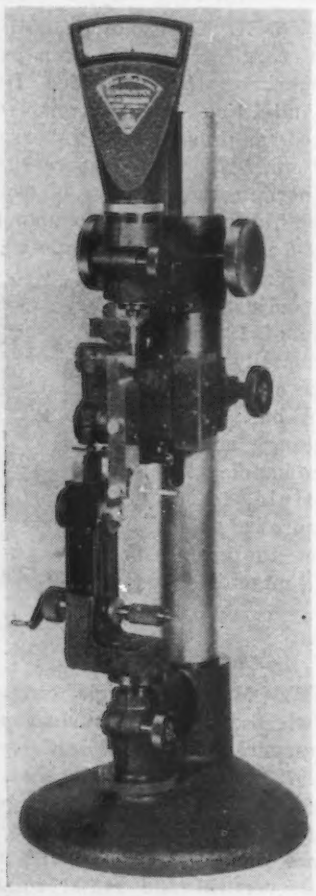
THE Model B angle computer, with a 9 x 16 in. surface plate, is announced by the *Angle Computer Co.*, 5720 Melrose Avenue, Los Angeles 38, for handling castings or parts weighing in excess of 75 lb. The surface plate is provided with horizontal, vertical and radial rotation.



The part or casting is clamped to the plate and every angle or compound angle is calculated or checked by means of dials equipped with verniers. All dials are graduated from 0 to 90 deg. in four sections of the circle.

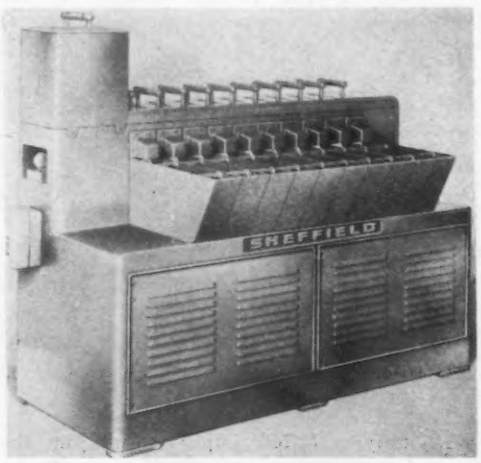
Gear Tester

THE portable Comparitol gear tester, manufactured by *the George Sherr Co.*, 128 Lafayette Street, New York, detects and locates faults during the manufacturing process and checks the accuracy of gears when completed. The master gear is placed on an arbor and the gear to be tested is placed on another arbor directly in contact with the master. By means of a handle with pinion, the gears are rotated, and any divergence or error is shown in the comparator head, which reads to 0.001, 0.0005, 0.0025 or 0.0001 in., depending upon the class of work and the precision required. The unit has a range of 1 to 6 in. center distance, with special attachments available, enabling the inspector to check down to the smallest center distance in highly precise gears.



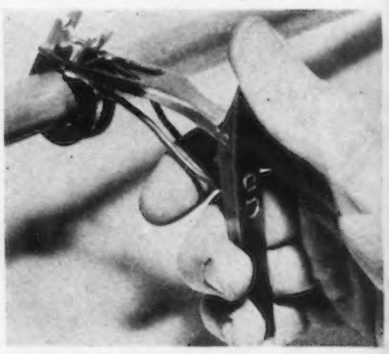
Ball Bearing Checker

A NEW type machine for precision checking of ball bearings has been built by *The Sheffield Corp.*, Dayton, Ohio, which checks and sorts ball bearings of dimensions ranging from ⅛ to 11/16 in. at the rate of 15,000 to 20,000 per hr. Balls are placed in the hopper and a walking beam or arm lifts them over a few inches to an opening with exactly parallel sides. If the balls are of the same size as the opening or smaller, they fall through and are retained in a compartment below. The walking beam carries the remaining balls on to the next stage where the aperture is slightly larger. The process is repeated until the balls drop into one of ten divisions or are too large to pass inspection and fall into the last compartment. Each successive step passes balls 0.00005 in. larger than the preceding size.



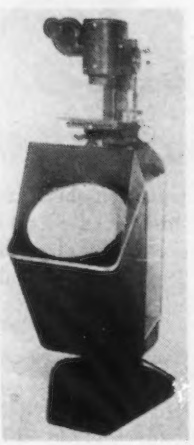
Clip Assembly Tool

ASSEMBLY of aircraft pipe, tube and conduit line support clips may be speeded up through use of a new clip assembling tool being produced by *Adel Precision Products Corp.*, Burbank, Cal. The tool consists of a metal handle in two parts, joined at a fulcrum for leverage, and a formed wire attached to the underside of the handle and extending along the anvil to act as a pincer. When the handle is jack-knifed, the pincers are placed over the open ends of the clip, and when the handle is straightened, the ends of the clip are brought together. The tool may be operated from front, back, above, or below.



Optical Comparator

A NEW optical comparator known as Model P2-14 has been placed on the market by the *Portman Machine Tool Co.*, 70 Mill Road, New Rochelle, N. Y. The co-ordinate stage is larger than on previous models and new type dial indicators having larger dial faces are used. The "Shaft-of-Light" lamp housing includes a new type of condenser lens unit, mounted as an eccentric assembly within the housing and provision is made for sensitive light beam adjustment. Magnification lens units of 10X, 20X, 31¼X, 50X, 62½X and 100X are available as standard equipment. The image screen is 14½ in. in diameter.

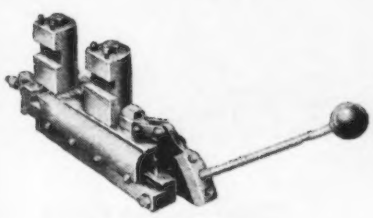


Pneumatic Tools

TWO portable pneumatic tools with malleable iron motor housings and malleable throttle heads are announced by the *Aro Equipment Corp.*, Bryan, Ohio. They are designed to withstand rough handling in the foundry and elsewhere. Each has a 2-in. wheel capacity and a speed range of 15,000 to 18,000 r.p.m. Model 221 has a button throttle control and Model 321 a lever throttle. They are available with a variety of adapters, collets and extensions.

Lever-Type Cross-Slide

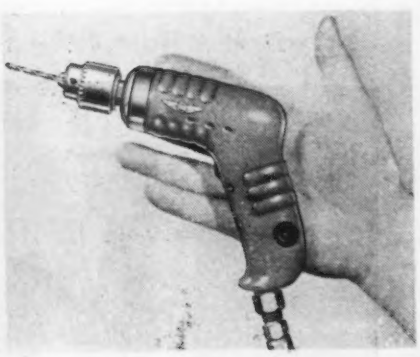
THE Precision lever type cross-slide recently developed by *General Die-Stamping Tool Co.*, 265 Canal Street, New York, has a capacity of 2½ in. The two tool posts which accommodate bits from ¼ to ⅞ in. are equipped with a tool leveling device that maintains tool in absolute horizontal position and is adjustable. It



is available in three models for use on 10 in. Atlas and Logan and 9 in. South Bend lathes.

Pneumatic Drill with Plastic Case

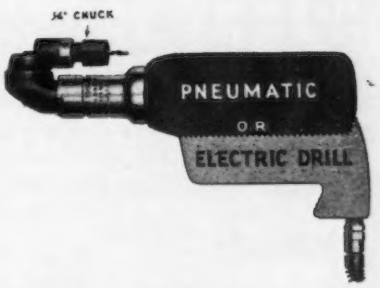
A LIGHTWEIGHT, portable pneumatic drill with all-plastic housing and handle is announced by the *Aro Equipment Corp.*, Bryan, Ohio. It operates at 2500 r.p.m., is 6¼ in. in overall length and accommodates ⅛, 3/16, ¼ or 5/16 in. drills



with Jacobs chuck. A non-slip grip is assured by the ribbing which is incorporated in the design of the plastic handle.

Universal Drill Attachment

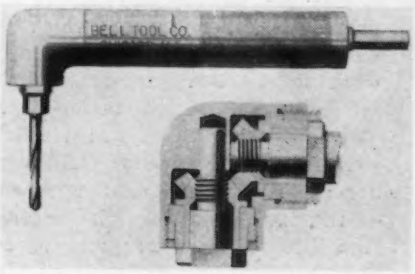
WEIGHING only 1 lb., the universal drill attachment manufactured by the *Kett Tool Co.*, Union Central Building, Cincinnati, permits drilling at any angle and may be applied to any electric or pneumatic portable drill, as well as on flexible shaft power units. The double swivel of the KUFS-5 permits adjustment at two joints, insuring complete flexi-



bility. The three-jaw chuck has 1/32 to ¼ in. range, is ¾ in. long and 23/32 in. in diam. Need for collets or twist drills with screw type shanks are eliminated.

Angle Head Tool

FEATURING an unusual miter gear design, the B-90 deg. angle head tool is offered by the *Bell Tool Co.*, 710 West Jackson Boulevard, Chicago 6. The sleeve of each miter gear



provides a large bearing surface to maintain true alinement of spindles and gears. The tool is built for use with a flexible shaft or other small portable tool. It will take adapter mounted bits for drilling, burring, reaming, countersinking, rotary filing and light grinding.

Cored Wire Drawing Dies

TO assist mills producing fine wire, etc., *Carboloy Co., Inc.*, 11155 E. 8 Mile Road, Detroit, has announced the availability of round hole cored dies in stock sizes as small as 0.004 to 0.007 in. The smaller cored die sizes eliminate the necessity for either an initially higher die investment or of piercing blank dies to produce diameters of wire down to 0.010 in. They are available with standard size R-2 Carboloy nibs and casing sizes either 1 or 1½ x 9/16 in.

Clamp for Light Work

THE seat of the Quick Lockcet, designed by *Grand Specialties Co.*, 3116 West Grand Avenue, Chicago, has a swinging, locking lever. The release trigger is equipped with powerful teeth which, under spring tension, hold a firm ratchet grip on the screw, which is released instantly with trigger pressure so that the screw may be slipped to any desired position or reclamped to other work of the same thickness without further adjustment. The company also has developed a heavy duty speed clamp for large, heavy work.

Belt Grinder Fixture

FOR speedier and more accurate surfacing of disk, squares and other small parts, the "In-Out" feed table has been introduced by the

Porter-Cable Machine Co., Syracuse, N. Y., for use with its G-4 type belt type grinder. Two tables, one at each side of the belt and both adjustable to the grit level, enable the stock to be fed to and received from the belt on a flat plane. An adjustable rail holds the stock against the pressure of the belt. The unit is equipped with hopper and in-feed and out-feed chutes for semi-automatic operation. It may be attached to a wet belt grinder.

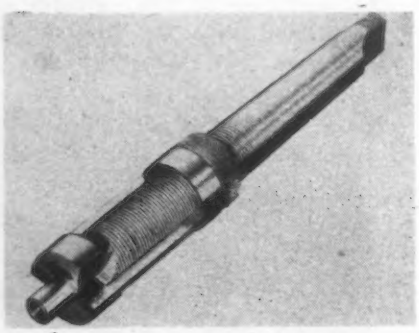
Toggle Pliers

A RECENT addition to the De-Sta-Co line is toggle pliers No. 455, designed to hold piping, tubes,

rods or other cylindrical parts during manufacturing. They lock into position and hold securely any cylindrical object from ½ to 1¼ in. o.d. For holding other sizes they are bored and slotted to order. The *Detroit Stamping Co.*, 345 Midland Avenue, Detroit, is the manufacturer.

Spot Facer and Counterboring Tool

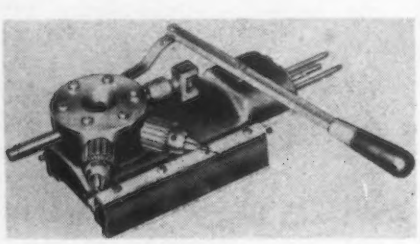
NASH-ZEMPEL TOOL DIV. of the J. M. Nash Co., 2354 North 30th Street, Milwaukee, announces a new spot facer and counterboring tool with cutter that can be quickly removed for sharpening by loosening a knurled nut and cone nut. Exact centering is obtained by the web in the body which locates the fingers of the cutter and the cone nut which centers the rear of the cutter on a straight line with the bar. The pilot



is tapped for screw which holds bushings for various sizes of drilled holes. The tools are made in 41 standard sizes.

Self-Indexing Bed Turret

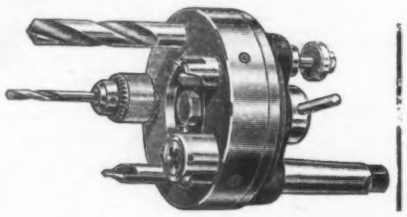
A SELF-INDEXING bed turret with six tool stations and six individual stops indexing with the turret is the development of *Kessler Aero Tool Co.*, 211 West Palm Avenue, Burbank, Cal. Back-indexing by hand may be done when using less than a full set of six tools. Turret head is mounted on a preloaded Timken bearing which can be adjusted for wear. The attachment is lever operated for rapid action and has a maximum stroke of 4 in., with a minimum index stroke of 1½ in. and total travel of 5½ in. The turret is



shipped completely finished and assembled except for turret holes which are left to be bored on the individual machine.

Tailstock Turret

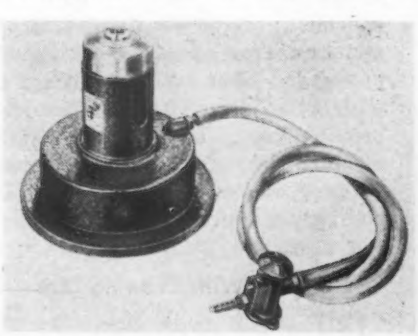
THE MASTER MACHINE CO., 433 Main Street, Stamford, Conn. has put out the Koehler tailstock turret, a compact and accurate attachment that permits the use of five different tools. It centers accurately by means of a taper pin and is locked in position by a lock nut. Five ⅝-in. holes in the indexing head accommodate standard floating tap and die



holders or box tools for drilling, tapping or threading operations. The turret is equipped with a No. 2 Morse taper.

Pneumatic Collet Fixture

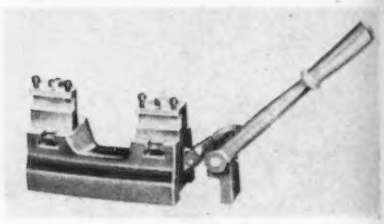
FOR drilling, milling and similar applications *Mead Specialties Co.*, 15 South Market Street, Chicago 6, has put on the market the C-18 pneumatic collet fixture, which provides a powerful and accurate grip on work up to 1-in. round, 23/32 in. square and ⅞ in. hexagonal. Accurate depth stop is provided by means of a hollow ram through which a depth rod of required length rests on the machine table. The fixture is furnished with an adapter for connecting the ram to any standard



draw-in collet up to 1-in. capacity; a corresponding closing-ring is pressed into the top of the housing. The valve may be operated by foot pressure or automatically. The gripping power is adequate to hold cylindrical work of alloy steel while threads are cut on the outside with self-opening die heads or ordinary dies. An alternate housing, Model C-180S, is available with sealed openings so that oil may be pumped up through the collet, forming a fountain which washes away chips as they fall.

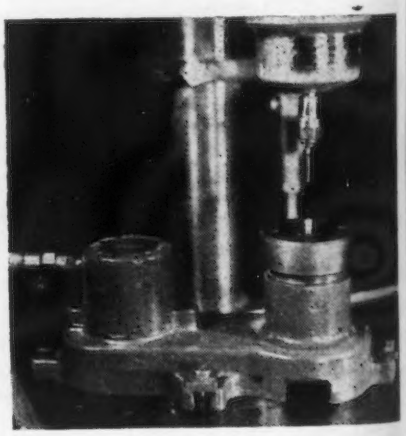
Lever-Operated Cross-Slide

A LEVER-OPERATED cross-slide for doing both forming and cut-off work in a single operation has been brought out by *Kessler Aero Tool Products Co.*, 211 West Palm Avenue, Burbank, Cal. Designed for easy adaptation to Atlas, Logan, 9-in. South Bend, Craftsman and similar lathes, this double tool post device operates without disturbing tool or carriage positions.



Collet Holding Fixture

TO accurately chuck screw machine parts for second-operation work on drill presses, tapping and milling machines, etc., for drilling, tapping, reaming, threading, chamfering, burring, counterboring and similar operations, *The Cleveland Air-tool Co.*, 4614 Prospect Avenue, Cleveland 3, is distributing the Red-E-Air chuck, an air-operated collet holding fixture. The tool is operated by a foot valve. Through a leverage action, the holding pressure at the collet is multiplied over the air line pressure more than 10 to 1. Production rate of 3 and 4 sec. on many parts are possible. The No. 0 size illustrated takes work up to ⅞ in. diam.



Terminal Puller

ARMSTRONG BRAY & CO., 5364 Northwest Highway, Chicago, has announced a bearing and battery terminal puller known as Steelgrip No. 13 and 13A. It is made in sizes with 2 and 5 in. reach. The arms are drop forged, heat-treated steel. The hooks are thin enough so that they will fit between bearings and motor housings and long enough to reach the bearing race.

"That Yankee gun they load on Sunday for the rest of the Week!"

These cynical and war-weary words were a Confederate soldier's description of a famous weapon of the Civil War. It was the Henry Rifle — a Yankee answer to a national emergency, back in the days of muzzle-loaders.

Benjamin Tyler Henry, the gun's inventor, was considered one of the greatest gunsmiths of the 19th century, and he helped to found the fame of Jones & Lamson in the early days of American industry . . . while the gun, in turn, commenced the fame of a great American company as the first of the world-famous line of Winchester Repeating Rifles.

* * *

It was on a Sunday that America looked up from the tragedy of Pearl Harbor and asked her industries for a Yankee gun — Today, Jones & Lamson machine tools and engineering are again helping to produce many Yankee guns such as this world has never seen before.

And after the war is over, our engineers and service men will play an equally important part in helping industry to convert to peacetime production . . . when new companies and products will once more stem from the men and the machines of America's oldest machine tool company. Call upon Jones & Lamson, now!

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

JONES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.

Profit-producing Machine Tools

Assembly Line . . .

STANLEY H. BRAMS

• Ending of European war and continuation in the Pacific may bring civilian production back to auto plants . . . Possibilities of reconversion depend on aircraft contracts, vary with each company.

DETROIT—Following on the discussion undertaken in this column during the past two weeks automotive firms are deep in the heart of reconvertability studies.

So long as the Japanese war continues, aircraft and aircraft component requirements can be expected to rise continuously. Ordnance needs, primarily in the fields of ammunition, guns and vehicles, will be shunted much lower than current levels.

At such a time, companies which have tied up key facilities with aircraft output will be less able to reconvert than companies primarily in ordnance work. Because of the mixed situation, it becomes necessary to analyse the industry's reconversion potential plant by plant:

Chevrolet, largest unit producer, can probably turn out limited numbers of passenger cars in fairly convenient order. Despite its heavy program on aircraft parts, this company has enough plants and enough standby facilities that it could likely maintain an exclusively aircraft armament program and still meet a certain amount of civilian demand, though considerable such production might be in branch plants rather than in "headquarters" plants.

Flint, the hub of the Chevrolet operations, is heavily engaged in Pratt and Whitney engine parts output, using machine shops which formerly supplied automotive engine components. Recent rearrangements of such schedules, however, may afford some leeway to Chevrolet, as it has to others, opening some facilities for automotive production in partial reconversion. Other Flint operations are mainly concerned with ordnance requirements which likely will be sharply cut when European war ends.

The next largest basic Chevrolet operation is at Buffalo, where car engines and sheet metal parts were formerly produced. Little likelihood exists that any such work could be undertaken again at this point until the end of the aircraft program, inasmuch as these operations are now centers for aircraft motor manufacture.

Ford, with which is included Mercury, should be able to make a fairly ready start in the event of any partial reconversion. The great Rouge works is so flexible that it would seem likely, when relief is afforded from ordnance commitments, that facilities and space could be developed for civilian car production. An abridged vehicle assembly line has been maintained for jeep output. Sheet metal and parts fabrication facilities also stand fairly readily at hand. The Ford tank assembly program has already been completed; the B-24 program is largely contained at Willow Run, with subassemblies from the Rouge produced in rather self-contained departments; and other major phases of the Ford program, so far as is known, are unlikely to directly interfere with partial reconversion.

Ford is not so fortunately situated as Chevrolet in regard to available branch plant facilities. Many outlying units have been sold or leased to the Army, and these likely will be unavailable while we are at war anywhere. But the lack of these facilities will impair mass production rather than limited production.

PLYMOUTH may have severe problems in any partial conversion. The plant at Detroit is handling a miscellany of military requirements, partially ordnance, partially aircraft. The aircraft work involved is fairly substantial and occupies a considerable proportion of plant space; it is likely to be in continued demand until the end of the war with Japan. It is possible that the aircraft operations could be moved over into a separate section of the main plant at Detroit. Then, if the ordnance load were lifted from the balance of the space, some limited amount of final assembly might be possible, after much physical reconversion.

Buick's prime stake in the armament program is the production of Pratt and Whitney motors, and only last week it was announced that the Flint division is laying off about 3000 employees and Melrose Park about the same number, due to Air Force adjustments of schedules for engines and parts. Inasmuch as aircraft engines output has lately outpaced the airframes program, it might be that in partial reconversion Buick could switch its entire engine program into Melrose Park, thereby leaving the Flint plant free for automobile production. However, this possibility can be figured a borderline one at this time.

DODGE faces a situation somewhat like Plymouth. Its plants are filled with a great variety of arms activity. But much of this is on ordnance work, giving indication that passenger car production could be undertaken even while aircraft and marine requirements continue to be produced. The Dodge truck plant, of course, has operated steadily on military vehicles, and hence a changeover is comparatively simple.

Pontiac faces a hopeful situation for reconversion. Its work has largely involved anti-aircraft gun manufacture, and this program is already definitely in a declining phase.

Olds is in comparable position. With the bulk of its war job concentrated on guns, this Lansing division of General Motors should be available for reconversion when the European war's end reduces ordnance needs.

Chrysler division is producing a variety of armament needs, mainly bound up with ground equipment. Marine tractors made at this plant do not occupy a preponderant share of space, and the same can be said for air raid alarm sirens, trailer fire-pumps, and other output. It would seem that the conclusion of the European war would permit fairly ready reconversion.

Studebaker should be able to reconvert fairly readily. Its largest war program is the production of aircraft motors, but these are manufactured in separate DPC plants. During the war Studebaker has produced military trucks, necessitating maintenance of many normal automotive parts facilities.

Packard is in admittedly poor position to reconvert until aircraft needs are all met. When the European war ends, British plants conceivably might be able to handle all Rolls-Royce en-

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gine requirements, supplemented by the new contract for these motors which will be at delivery stage next year at Continental Motors Corp. Pending such turns, however, Packard will be up to its ears in aircraft and marine motor production. Reconversion will have to await a day when this production is no longer required.

HUDSON'S reconversion possibilities are obscure. The plant is building such widely divergent requirements as anti-aircraft guns, armor fuselage sections, aviation engine parts, ammunition components, naval vessel equipment and other jobs. Assuming a near-end to the ordnance jobs, considerable space would still be utilized for aircraft and naval requirements, and these might likely interfere with normal automobile output. In addition, Hudson's body shops are loaded with airplane contracts.

Nash is in a difficult situation. Its Wisconsin operations are tied up with aircraft engine and helicopter work. Until these programs are concluded, chances of finding space for passenger car production must be considered thin.

DeSoto is producing airframes. This program, like other aircraft programs, looks like a continuing job until the war with Japan ends; in such a situation a resumption of passenger car activity appears difficult.

Cadillac's plant in Detroit, while heavily loaded with Allison engine parts, also has been devoted in major degree to the production of medium tanks. With an ending to this program it would seem that facilities and production line space might be available once more for manufacture of cars. The problem here would seem to be bodies, for normal sources are primarily in Detroit Fisher plants, and these appear fairly well booked for quite a time ahead.

Willys-Overland should be able to resume passenger car output fairly readily. The large share of its program has been in connection with the jeep, and to this end it has been necessary to maintain assembly line and parts production facilities. Reconversion should be accomplished readily if the jeep program concludes with other ordnance wind-ups; even if it continues, room might be available in the schedules to manufacture passenger cars as well.

Lincoln will have difficulty resuming. Much of its facilities have been torn up to make room for an aluminum foundry which cuts right through the plant, and much rebuilding and re-equipping lies ahead before passenger car output can be attempted again.

The conclusions above were based primarily on observations of the individual companies, rather than corporate attitudes. Naturally, no concern yet sees its reconversion hand clearly, nor is revealing incomplete findings. As result, there may be surprises when an actual go signal is given. But the analyses above may serve as a broad approach to the general problem.

o o o

Ford Starts Sulphur Extraction Plant

Detroit

• • • A new sulphur extraction plant is now in operation at the Ford Motor Co., designed to purify coke oven gas and protect vital manufacturing equipment. Approximately six tons of 99 per cent pure sulphur are extracted daily from the 54,000,000 cu. ft. of coke oven gas produced every 24 hr. at the Rouge.

Elimination of hydrogen sulphide from the gas was decided on to reduce corrosion in facilities in the heat treat furnaces, the magnesium smelters, the armor plate building and other Ford operations.

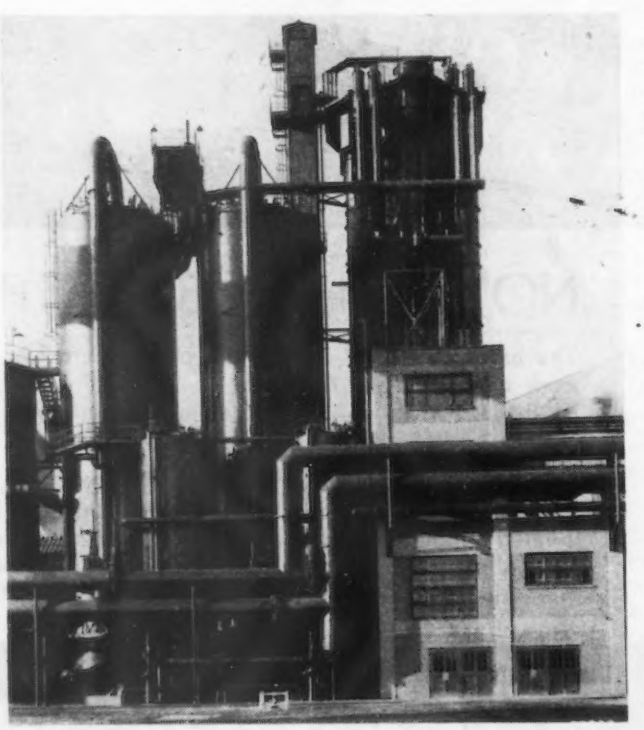
The sulphur extraction equipment, built by the Koppers Co., utilizes the ammonia thylox method.

When the gas reaches the sulphur plant, ammonia and coal tar have already been removed. The gas is pumped into coolers and thence into absorbers. Two absorbers, each 90 ft. high and 22 ft. wide, receive thylox solution at a rate of 150,000 gal. an hour. Temperature ranging from 98 to 100 deg. F. is maintained. Sprays distribute the solution. These absorbers also receive ammonia gas, simply to maintain the alkalinity of the solution. As the coke oven gas floats upward through the absorbers, its hydrogen sulphide impurities react with the thylox solution, and the gas emerges 97 per cent free of hydrogen sulphide. It then travels to final coolers and light oil scrubbers.

The remainder of the process recovers the sulphur from the fouled thylox solution. The solution goes into a surge tank and is then pumped into a Weir box for distribution to four primary thionizers, each 5 ft., 3-in. in diameter and 120 ft. high.

A secondary battery of four thionizers repeats the process. The slurry, containing 5 per cent sulphur and 95 per cent thylox solution, is then gravity fed into a large slurry tank for gravity feeding into a continuous Oliver filter. Sulphur is deposited in this filter on a canvas covered revolving cylinder, the deposit consisting of 50 per cent sulphur and 50 per cent moisture.

The sulphur is then shaved from the cylinder and finally fed into an autoclave. Heating to 240 deg. F. melts the sulphur, after which it is poured into 12x 12x6-in. iron molds. The cooled cakes are then ready for shipment.



The sulphur itself can be utilized as a base for fungicide or for bleaching wood pulp. Ford officials figure this recovery is only a fraction of the savings involved in the operation. It is estimated that the prolonging of life of millions of dollars worth of equipment will liquidate the cost of the new plant in three years.

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Washington . . .

L. W. MOFFETT

• Wand waving highlights conversion planning . . . Public misled on early civilian production . . . WMC manpower crisis predictions due for exposure . . . Industry watchful of political preference in conversion plans.

WASHINGTON—When the automobile industry was in the throes of war production conversion discussions with government officials in the early part of 1942, Charles E. Wilson, General Motors president, said that the government's attitude at that time was typified by a cartoon he had seen. The cartoon pictured a magician making cabalistic gestures toward a huge building marked "Automobiles," and saying "Aligazam."

Unfortunately, today there is still a great deal of this wand waving complex present in the thinking of many of those who will have to deal with the government's side of mid-war conversion. This is true of some Army and Navy people, officials in WPB and likewise of some members of Congress.

WPB has convinced the Army and Navy that civilian production should be resumed as soon as practicable, but when this becomes general will depend in a large part on the attitude of the War Department which has up to recently been rather hostile toward the idea. The lifting of production restrictions will only mean that civilians will get needs filled at some future indeterminate time.

For instance, the Office of Civilian Requirements has gotten up market surveys on the needs of housewives in the electrical appliance field. Now, many OCR officials think that just as soon as manpower becomes available in an area where there is capacity to produce a particular electrical item, resumption of output will begin almost immediately, or just as soon as materials become procurable.

The public, of course, has been misled into thinking that a tremendous upsurge of civilian production will follow within two or three months of the end of the European war. Nothing could be farther from the truth. Some business men believe that complete reconversion may not occur until a year after the war with Japan.

The ghost of unemployment may materialize into a full fledged goblin just as soon as really heavy contract cancellations are made, and much before management and the government are ready to deal with the problem. The tempo of this cancellation is increasing, with more than $3,000,000,000 worth slated within the next 90 days, according to current reports.

The constant explanation by government officials that cut-backs and terminations are mere "paper-cuts" or are being compensated for by the placement of new contracts totaling in an equal amount cannot be believed forever. The WMC estimates of the tightness of manpower are bound to be soon revealed gross exaggerations on the high side.

The Army and Navy cannot continue very long to terminate contracts without serious labor dislocation.

This is apparently good news for proponents of an early reconversion period. But it is also bad news.

THE Washington officials who are withholding information on the true trend of manpower demand from industry with the thought that an eased demand will automatically solve a large part of the reconversion problem are due to be fooled.

In the first place the skills of freed manpower must be turned to civilian industry's requirements which are not the same in every case as that of war industry. Even the increased emphasis on expanding individual military programs will not take up the slack because thousands of workers cannot fit into civilian manufacture. The lack of interchangeable skills will cause serious unemployment.

Furthermore, the Labor Department estimates that there are 2,000,000 workers in the labor force who never would have worked if the war hadn't come along. These include men who were eligible for old age benefits under the Social Security law, together with housewives with families, and are expected to leave the labor force permanently when the war ends. This is a complication which may lead to tight unemployment areas where the employees might be needed for civilian production.

So when the manpower blow-up comes, jobs in war plants will be at a premium. Civilian industries will have to take those workers who are unable to get war jobs. It is assumed that workers with draft deferments will try to remain in the war industries so they can retain exemption from military duty.

To prevent indescribable confusion and delay in reconversion, it is imperative that the public should be informed of when the big break in war production is coming far enough in advance so that fairly firm plans can be made. Manufacturers have to know as soon as possible what manpower and material supply, and what plants and machinery are expected to be available when the bars against civilian production are let down.

This information is largely in the hands of the War and Navy Departments, and in a second hand state in WPB and WMC. Not one of these agencies has made public what industry can expect in the degree necessary for tentative plans.

Moreover, if too long a time is spent in indecision about informing industry because of political expediencies of one kind or another, the return to a healthy peace economy may be delayed for an indefinite time.

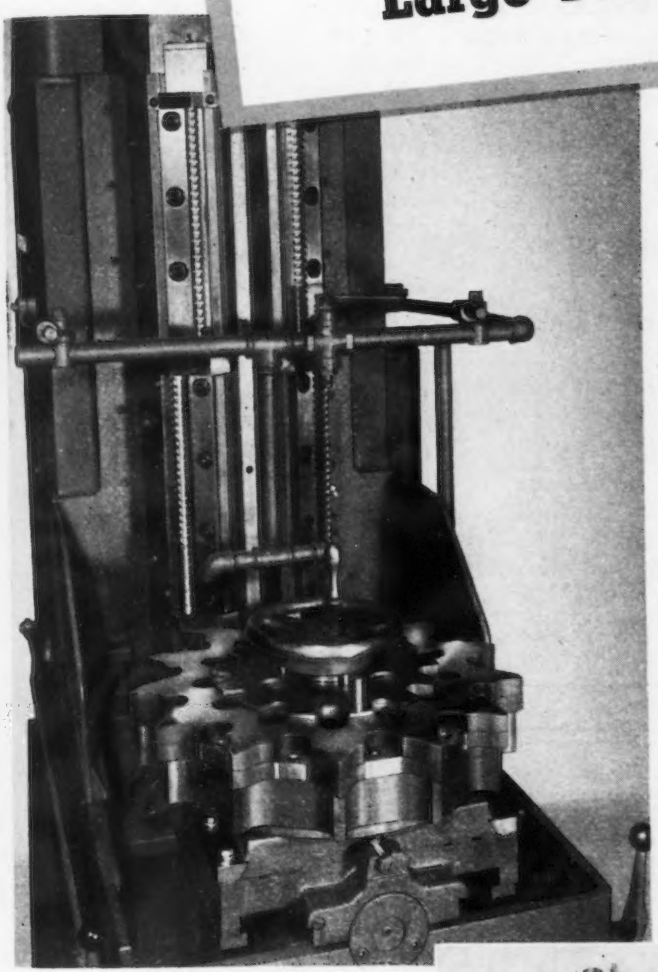
OTHER difficulties face reconversion. The basic ones are: financing; termination settlements; replacement and rearrangement of machinery and industrial equipment and the disposal of government-owned machinery and plants, and of inventories and work in process.

These problems are merely preliminary. Industrialists know that the return to peacetime production faces the same types of choke points as conversion to war production did.

Certain components, machinery and materials in the desired forms and types are going to be scarce, since the manufacturing needs of war production are different from those of peace.

Many industries will have to build up distributing channels anew. Many wholesale and retail outlets have become war casualties because of a lack of civilian goods inventories. Salesmen have either gone into the armed

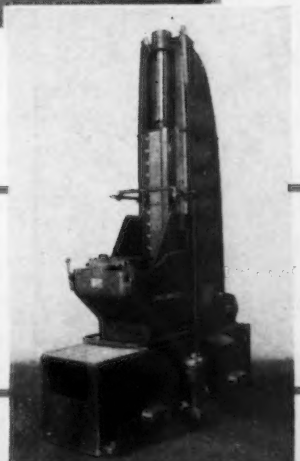
New and More Economical Way of Finishing Large Tooth *Profiles*



The teeth of large sprockets, especially those which are comparatively thin, present several problems in machining. Not the least of them is how to obtain the correct profile and a good smooth finish, while maintaining a satisfactory rate of production. After analyzing the various requirements, CINCINNATI Service Engineers decided that a job of this type could be done more economically by the *broaching process.* The illustration at left shows how the part was tooled up on a CINCINNATI No. 10-66 Single Ram Hydro-Broach Machine with receding table.

The secret to the success of this equipment lies in the arrangement of broach inserts. *They are made in three sections, each having a simple curvature. Inserts are mounted on sub-plates, and each section may be independently adjusted.* The opposite faces of two different teeth are broached in one pass of the ram. A hand indexing fixture, operated during the return stroke of the ram (and while the table has receded), holds one sprocket.

CINCINNATI Service Engineers have many years of experience in solving unusual machining problems by the economical surface broaching process. They will be glad to study your production methods for possible improvements.



● CINCINNATI No. 10-66 Single Ram Hydro-Broach Machine. Complete engineering specifications may be obtained by writing for catalog M-886. For a quick picture of these machines, look in Sweet's catalog file for Mechanical Industries.

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services or into war industries. Manufacturer's representatives have too.

Delays by the government will be caused by disputes over which companies should be permitted to start civilian production first. This will arise when it becomes apparent that there is sufficient manpower within a particular area.

WPB has the notion that it should referee the new production decisions, but the agency faces violent opposition if it tries to do too detailed a job. Without much trouble, WPB should be able to start the automobile and other heavy industries on an even basis in the race for competitive advantage. Smaller industries will very likely be left to their own devices.

No matter what industry or WPB wishes, inequities are bound to arise. and loss markets are inevitable when companies in relatively free labor areas are permitted to gain competitive advantages through being able to start production first.

Industry is going to be very watchful of anything Washington does which might be even slightly tinged with political preference.

□ ○ □

Ore Shipments Hit 84,404,852 Tons

Cleveland

• • • **With the last loads** of ore scheduled to dock at lower lake ports early this week, the total downlake Lake Superior ore shipments for the 1943 shipping season hit 84,404,852 gross tons, with December shipments totaling 749,512 gross tons. The bulk of December shipments came from the Duluth, Missabi, and Iron Range Railway docks at Duluth and Two Harbors, Minn., these docks accounting for 651,682 tons of the total.

While shipments during 1943 were the second highest in history, they did not come up to original expectations. However, there is no concern felt among consumers in regard to the availability of ore before the 1944 lake season opens.

Lake shipments of iron ore for the past several years were as follows:

Year	Shipments, Gross Tons
1943	84,404,852
1942	92,076,781
1941	80,116,360
1940	63,712,902
1939	45,073,052
1938	19,263,011
1937	62,598,836
1936	44,822,023
1935	28,362,368
1934	22,249,600

WHEN YOU FELLERS RETIRED, YOU RECALL IT TOOK ABOUT TWO HOURS TO TURN OUT ONE BEVEL GEAR THIS SIZE -- WELL, THIS IS ABOUT TWO HOURS' WORK! FEEL TH' BOTTOM ONES-- THEY'RE WARM YET!
THAT'S A CRIME TO BRING THEM OLD BOYS BACK TO SHOW 'EM THAT THEY DIDN'T DO ANYTHING IN LIFE!
THAT STARTLES THEM OL' GUYS! OLD DAVE LOOKED AT THE MACHINE AN' THEN AT TH' PILE AND HE SEZ TO TH' GIRL, "WHUT DID YOU DO, HIT TH' JACKPOT?"
J.R.WILLIAMS
THE MAGICIAN
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12-17

October Steel Output in Canada Shows Sharp Rebound

Toronto

• • • **Canadian** production of steel ingots and castings in October jumped to 271,976 net tons, 92.2 per cent of capacity, against 241,255 tons in September. For 10 months ending with October production was 2,509,712 net tons, a loss of 2.8 per cent from the record of 2,580,715 tons produced in the same period of 1942.

Pig iron production during October totalled 146,794 tons, practically even with September when output was 147,902 tons, but below the 175,424 tons produced in October, 1942. Production included 130,408 tons of basic iron of which 1,514 tons were for sale; 9,273 tons of foundry iron and 7,113 tons of malleable iron, all the two latter grades for sale. For 10 months cumulative production of pig iron totalled 1,478,760 tons, .11 per cent below the all-time high record of 1,640,055 tons in the same period of 1942. Ten stocks were blowing at the month's end.

•

More Metals Released For Certain Civilian Products

Washington

• • • **WPB has permitted** manufacturers of baking pans, vacuum bottles and garment hangers to use certain kinds of metal after Dec. 9 to bring their production up to the quotas allowed under Order L-30-d.

Baking pan manufacturers, who are having difficulty obtaining new bessemer steel, may now use available warehouse and mill stocks of tin mill black plate rejects.

Makers of vacuum bottles may now use zinc and aluminum as permitted by the limitation orders on these metals, as well as iron and steel previously permitted.

Wire hangers may now be made of wire shorts or rejects, as well as distressed stocks or those in manufacturers' inventories on July 17.

•

U. S. Steel's Shipments Show Decline for November

• • • **Shipments** of finished steel products by subsidiary companies of United States Steel Corp. for November were 1,660,594 net tons, against 1,794,968 net tons in October. For the year 1943 to date, shipments were 18,525,206 net tons compared with 19,214,522 net tons in the comparable period of 1942, a decrease of 689,316 tons.

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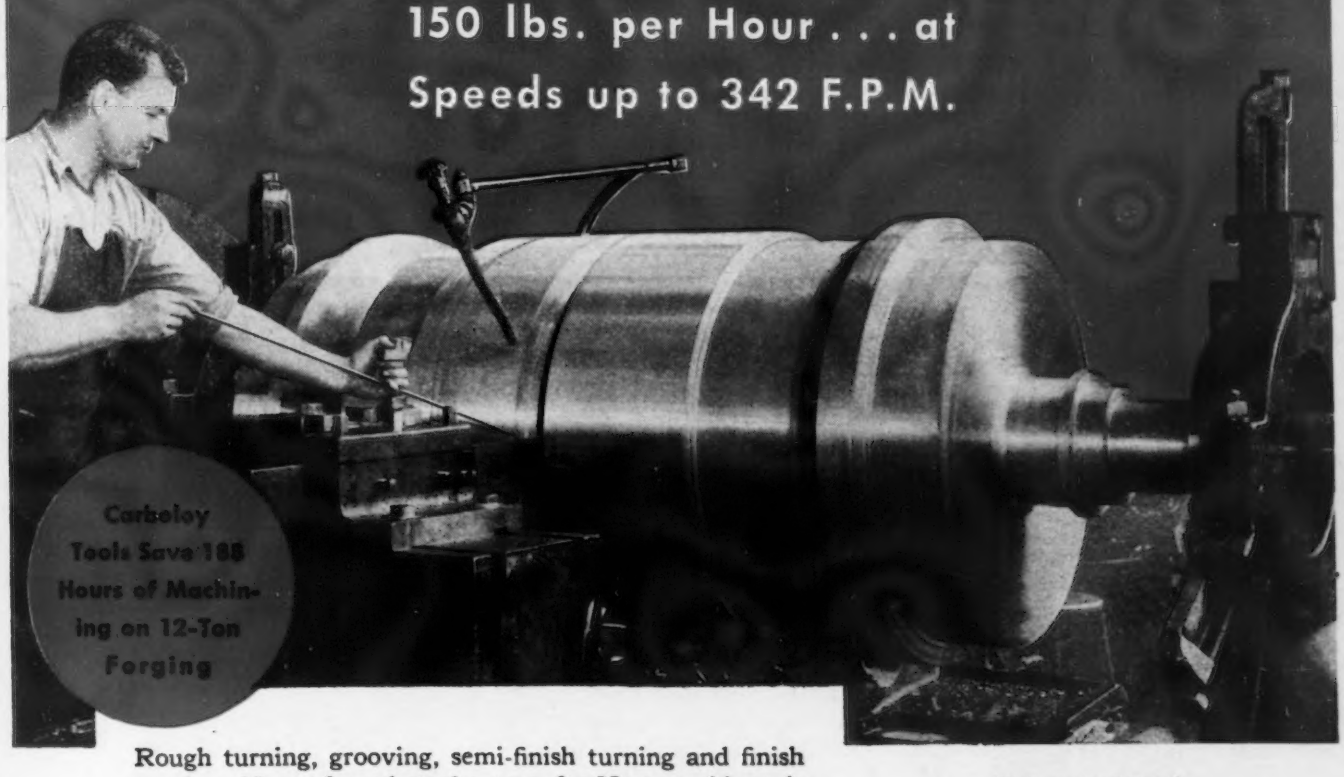

Rough turning, grooving, semi-finish turning and finish spacing, 12-ton forged steel rotors, for Navy turbines, is a job that's "tough" on tools. To complete these operations, six tons of steel are removed, with tools taking cuts often as deep as ¾". Indicative of the ability of Carboloy tools to step up steel cutting production on heavy work such as this is the performance of Carboloy Grade 78-B on this application. Operating at various speeds ranging up to 342 F.P.M., and feeds from .010" to .047" Carboloy tools remove 150 lbs. of steel per hour, completing the job in 3⅓ days of actual machining time instead of the 11 days 4 hours formerly required.

Carboloy tools—with hardness ranging up to 92.5 Rockwell "A" and transverse rupture strength up to 295,000 p.s.i.—are designed for the entire range of steel cutting. There is a grade for every application on steel, whether your job involves heavy duty work—such as these rotors, or high-speed, precision finishing, holding tolerances as close as 0.0002".

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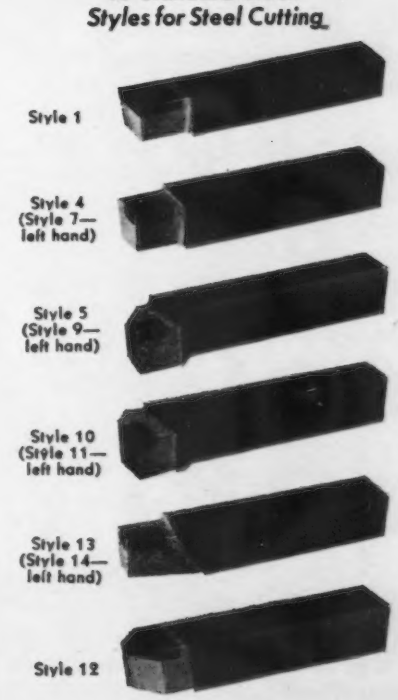

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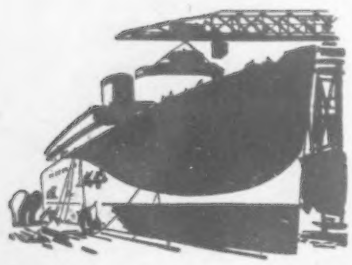
WEST COAST . . . .

OSGOOD MURDOCK

• Geneva Steel Co., produces first coke . . . Boeing breaking records on Flying Fortress production . . . Northwest scrappies under fire . . . Oregon Electric Steel Rolling Mill, Inc. sold and scheduled for immediate production.



GENEVA, UTAH — Coke was produced Dec. 14 for the first time in the by-product coke ovens at Geneva, Utah, according to officials of Geneva Steel Co., U. S. Steel Corp. subsidiary. This is the initial phase of operations at the $180,000,000 steel plant near Provo, designed to supply ship plates for the west coast shipbuilding program. As reported in this magazine last week, the structural mill of the new plant has been ordered abandoned.

It was in April, 1942, that the 1600-acre plant site was cleared of small farm buildings which dotted the area. Construction was undertaken at the request of Defense Plant Corp. by Columbia Steel Co., west coast subsidiary of U. S. Steel. In August of this year, Geneva Steel Co., a newly-formed U. S. Steel subsidiary, contracted with DPC to operate this plant for the duration of the war without profit or fee. It is expected pig iron will be made this month.

AFTER nearly five months of a labor recruiting drive, which attracted nationwide interest, the Boeing Aircraft company's plea for 9000 additional workers has started paying dividends. Unable to meet the Army demands for Flying Fortresses when the labor drive started last July, the company announced they are not only fulfilling all demands but are also breaking production records.

During the month of November, Boeing increased production of the bombers 10 per cent over October, which was also a record month. The November increase was 29 per cent over the month of August, when the manpower situation looked the blackest and the Army was threatening to cancel its small arms contracts in the territory in an effort to direct workers to Boeing.

This extra output was done with 3000 less employees than had originally been requested. From September until November 6103 employees were added to the company's payroll. Of these 3191 were gained at the main Seattle plant, 1824 at the newer Renton plant, and 1088 in the branch plants, which have been developed in six nearby towns. Of this total increase of workers, 1928 came from the efforts of out of state recruiting teams working throughout the mid-West and the South.

ALSO having their troubles are five Northwest scrap iron and steel firms, brought into court to face Office of Price Administration charges of violating ceiling prices. The Cunningham Steel Foundry of Seattle is alleged to have paid more than the ceiling price for scrap metal, while two other Seattle firms, the Alaska Junk Co. and the Iron and Metal Co. and the Riverside Junk Co. of Everett and the Frank Sussan Co. of Tacoma, are alleged to have sold at prices over the ceiling.

The suit was filed last March, after an investigation by OPA agents a year ago. Facing 15 charges, the firms are confronted with far stiffer counts than the OPA filed against California firms previously, when the government operatives were reprimanded in court for involving the firms in red tape.

OREGON Electric Steel Rolling Mill, Inc. at Portland, Oregon has been purchased by Kenneth B. Hall and Arthur M. Mears, local industrial men who are owners and operators of the long-established Hesse-Ersted Iron Works. Mears, secretary of the latter company has become president of Oregon Electric Steel Rolling Mills and will be in active charge of the management. It is announced that the mill will be immediately placed in operating order for its rated production of 75,000 to 80,000 tons a year. The 20-in. mill is already operating, the 14-in. mill will be ready to roll by the middle of January, it is announced, and the 9 in. mill shortly thereafter.

This plant was constructed and equipment installed within the last 18 months under the ownership and management of Morris and Sam Schnitzer and Harry J. Wolf. A 25-ton electric furnace operates entirely on scrap, and provision has been made for the addition of a second furnace of the same size. The buildings, location, and arrangement of the plant are among the most impressive in the Far West for an operation of this size. Part of the original equipment and planting proved faulty, and after partial operation for only a few months the plant was shut down before the first of November. Reconstruction Finance Corp. has a loan of $600,000 on the mill.

Hesse-Ersted Iron Works Inc. has been established at Portland for many years as a jobbing foundry and machine shop, and has produced logging equipment and more recently equipment for the Maritime Commission and for Oregon shipyards.

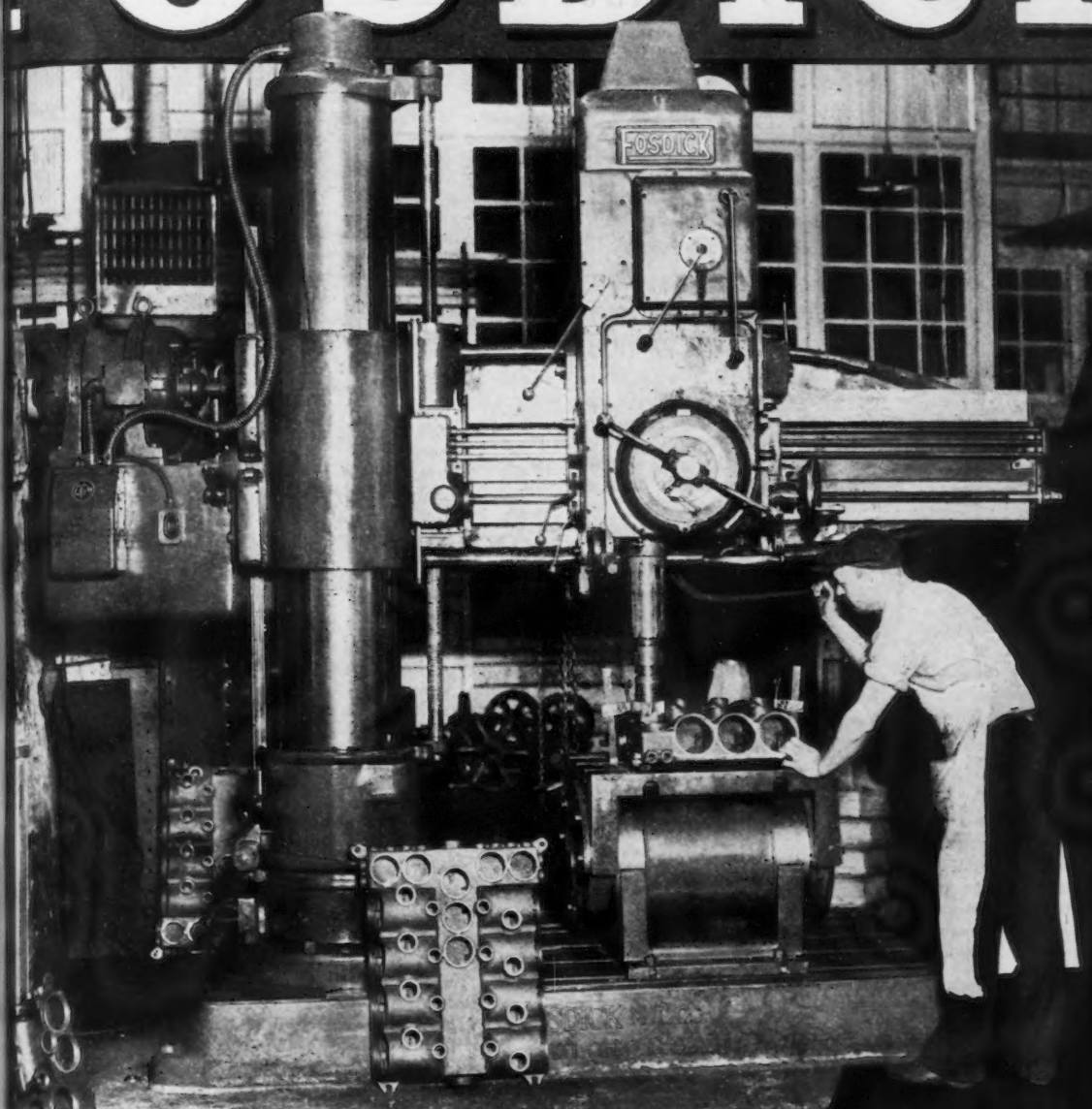
Associated with the operating management under the new ownership will be Irving H. Kulp, for 16 years with the Colorado Fuel & Iron Corp. at Denver, and for the past year with the War Production Board and the Maritime Commission in Washington, D. C.

Tool Makers Organize To Fight Surplus Dumping

Detroit

• • • **Discussion of a program** for orderly disposition of cutting tools left as surpluses after completion or cancellation of war contracts was the prime item of business before a gathering of about 150 cutting tool company men in Detroit Dec. 10. The representatives voted to organize into a formal group, the National Association of Cutting Tool Manufacturers. A prime objective will be to encourage stabilization of the tool market through avoidance of any dumping of surplus stock. The program under advisement provides that on the termination of any contract, the left-over cutting tools will be sent to a central warehouse for inventory.

FOSDICK



4 OPERATIONS—23 HOLES —3 DIFFERENT DIAMETERS *Completed at one setting*

It is this versatility plus ample power and concentrated controls that makes Fosdick Radials popular on the tough jobs.

On the work shown eight 1 inch diameter holes are reamed and threaded . . . eight 1¾ inch holes bored, faced and threaded . . . seven 3⅛ inch holes bored, faced and threaded—all at one setting in one hour and 30 minutes.

Today in hundreds of War plants—24 hours a day—Fosdick Radials are performing important operations on badly needed equipment for our fighting forces.

Whether your work requires one operation or a dozen you can do them faster and better on a Fosdick Economax Radial. Write for Fosdick Radial bulletin R. I. for complete information.

ECONOMAX *Hydraulic* RADIALS

HYDRAULIC VARIABLE RAPID TRAVERSE TO HEAD

HYDRAULIC COLUMN CLAMP

FOSDICK MACHINE TOOL COMPANY
CINCINNATI . . . OHIO

Briefly Told—

• *A total of nearly $465,000,000 was spent by the steel industry in 1942 for repairs and maintenance in order to keep its war effort at maximum efficiency, according to the American Iron and Steel Institute. This represents an increase of more than 10 per cent over the $420,000,000 expended in 1941. Plant maintenance cost in 1942 averaged about $7.45 for each ton of finished steel produced.*

•

• **Domestic bookings of electric industrial trucks and tractors during the month of September totaled 712 units, according to the Industrial Truck Statistical Association, Chicago. The net value of chasses only booked during September totaled $3,943,962.40 compared with $2,930,767.50 in August.**

•

• Capture of a German 105-mm. anti-aircraft gun, recently unloaded in New York, revealed that rear dual wheels were copied from American designs developed by Differential Wheel Corp., Detroit.

•

• *Blaw-Knox Co. was honored for its participation in the creation of the American Synthetic Rubber Industry by the 1943 Committee of Award for Chemical Engineering Achievement at a dinner in the Waldorf-Astoria Hotel in New York, Dec. 8.*

•

• **Pratt & Whitney Aircraft engineers have developed a water injection device adaptable to the 2000-h.p. double Wasp engines. The auxiliary equipment is designed to be used much as a pilot fires his machine guns. It gives an added surge to the engine to increase the climb or speed when urgently needed.**

•

• Westinghouse Lamp Division, Bloomfield, N. J., has issued a 175-page "Lighting Handbook," The book will

•

• *Local Pittsburgh draft boards have been warned to attach increasing importance to occupational deferments, in order to assure continued necessary war production. Continued cooperation, in granting deferments to key workers, regardless of age or marital status, was asked by Col. George H. Hafer, Deputy State Draft Director.*

•

• In the past two years, war products totaling nearly $13 billion have been delivered for military use by automotive concerns now operating at a war production level of more than $10 billion annually, the Automotive Council for War Production reported in a summary of automotive industry production since Pearl Harbor.

•

• *In an address before the Reform Club in Montreal, C. D. Howe, Minister of Munitions and Supply, stated that a period of post-war prosperity for Canada is assured, and added that the more difficult problem of unemployment is capable of solution. He stated that the primary essential of the conversion period is continuance of close partnership between government, manufacturer and worker.*

•

• Production of ferro-alloys in Canada in October amounted to 16,843 net tons against 17,007 tons in September and 18,266 tons in October, 1942. For the 10 months ending Oct. 31, cumulative production attained the all time high record of 185,480 tons, compared with 177,336 tons in the same period of 1942.

•

• *The Milwaukee Association of Commerce, representing most of the city's industrial plants and business houses, contemplates action through its executive director to have the recent order of the manpower board of a 48-hr. work week rescinded.*

•

• General Malleable Corp., gray iron and aluminum founder at Waukesha, Wis., is reported contemplating the installation of $600,000 worth of plant equipment with government approval.

•

• Signing of a government contract for driving of a 17,300 ft. drainage tunnel to unwater vast flooded metal resources in the Leadville, Colo., zinc-lead area was announced recently by Secretary of the Interior Harold L. Ickes.

•

• *Atlantic Coast Line Railroad has placed an order with the Tennessee Coal, Iron & Railroad Co., Birmingham, for 47,000 tons of rails, and the Florida East Coast Railway has placed an order for 22,360 tons of rails with the same company.*

•

• State Labor Director W. Emmett Brooks held recently that Alabama's recently enacted labor regulatory law voids any closed shop agreement now in operation in the state.

•

• **Straight line mass production of more than 70 basic types of aircraft instruments and engine components at a current rate of more than 375,000 units per month has been achieved since Pearl Harbor by the Eclipse-Pioneer division of Bendix Aviation Corp. and its sub-contractors, according to Raymond P. Lansing, vice-president.**

•

• **Westinghouse Electric and Mfg. Co. delivered more equipment for the fighting fronts and war industries in October than in any other month in the company's history, it was reported recently by A. W. Robertson, Westinghouse chairman.**

•

• Development of a new type non-corrosive carbine cartridge which reduces gun barrel cleaning to a minimum in that it leaves no damaging deposit in the barrel when it is fired, has been announced by Thomas I. S. Boak, works manager of the Winchester Repeating Arms Co., New Haven, Conn.

•

• **The St. Louis-San Francisco Railway has asked for authority to expend $5,845,429 for improvements in 1944, including 140 miles of 112-lb. rail and tie plates required. The hearing was set for Dec. 9. St. Louis-Southwestern's 1944 budget, set for hearing on Dec. 24, totals $2,815,092.**

• Canadian National Railways has awarded contracts for 4700 freight cars, of which 4200 will be built by Canadian firms. Canadian National also has placed an order with Montreal Locomotive Works for 30 locomotives.

•

• *American troops are now using ammunition that fires equally well in any climate or temperature on earth. A single type primer for machine gun and rifle ammunition is used in all combat zones and was developed by the Winchester Repeating Arms Co., according to one of its spokesmen.*

•

• The Department of Munitions and Supply and the Wartime Prices and Trade Board in Canada have started to delete the maze of controls that have been introduced over the past four years and there appears to be a definite trend toward resumption of peacetime manufacturing activities of a much broader scale than at any time since the outbreak of war.

•

• *Canada's Department of Munitions and supply recently announced the formation of a Carbide Cutting Tools Technical Committee which will deal with the dissemination of information on the use of tungsten carbide cutting tools.*

•

• **Production has been resumed in volume at Harry Ferguson, Inc., the farm tractor affiliate of the Ford Motor Co. Production is reported at 150 tractors a day. Output is initially on a block of 25,000 tractors whose production was assigned to the Ferguson organization. Employment now stands at 3000 men.**

•

• In a characteristic news release, the OPA announced that because the branch of one of the largest war plants on the north shore (Massachusetts) allegedly has not enforced group riding and has allowed its workers to drive to and from work alone in their cars or with only one other passenger it was necessary to revoke the special OPA designation which made thousands of workers of this plant eligible for automatic restoration of cuts in the gallonage value of the "B" and "C" gasoline rations.

•

• *Believing that cooperation with Argentina would be advantageous to America, P. Frank Patterson, assistant export manager of the Newport Rolling Mill, in a speech, last week, before the Foreign Trade Club at the University of Cincinnati, declared that "if we treat Argentina not as a younger brother, but as an equal, we eventually will secure the cooperation of one of the most progressive nations south of our borders."*

. . . Cited for Awards . . .

American Cystoscope Makers, Inc., American Catheter Corp., Port Chester, N. Y.

Bradford-Kennedy Co., Bradford-Kennedy Box Mfg. Plant, Omaha, Neb.

Electrolux Corp., Old Greenwich, Conn.

Elgin National Watch Co., Jewel Bearing Division, Plant #3, Aurora, Ill.

General Motors Corp., Delco Radio Div., Kokomo, Ind.

Globe Union, Inc., Milwaukee Plant, Milwaukee, Wis.

Kennedy Van-Saum Mfg. & Engineering Co., Danville, Pa.

Liggett Spring & Axle Co., Monongahela, Pa.

A. R. Maas Chemical Co., South Gate, Cal.

Minnesota Fire Equipment Co., Lindstrom, Minn.

United States Rubber Co., Footwear Div., Naugatuck, Conn.

Albert Wright, Oakland, Cal.

THE SECOND FRONT?

That life-or-death second front demands every knockout punch we can throw at the enemy. Our fighting men must be given every lethal weapon we can muster. Success depends on two mighty words . . . *steel scrap.*

Without more scrap there won't be enough steel for the ships, guns, shells and trucks our men need to win. Remember, every ton of new steel requires a *half-ton of steel scrap.*

Even in normal times, scrap piles dwindle during the winter. Help build them up again during the critical months ahead. The metal from obsolete and broken tools, dies and machines is desperately needed. Heavy scrap is especially desirable, but every pound helps. Make this your yardstick: If you see no future use for a piece of equipment scrap it!

Now is the time for your salvage committee to put on extra steam. Collect everything that doesn't serve a useful purpose. Separate the ferrous and non-ferrous metals and then call the scrap dealer.

The reward is great: precious lives saved and a shorter war. It's an extra, vital job that industry must share. The American Rolling Mill Company, 3091 Curtis St., Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORPORATION

IT STARTS AT YOUR SCRAP PILE

This advertisement is in support of the Salvage Program of the Bureau of Industrial Conservation, War Production Board.

Fatigue Cracks . . . BY A. H. DIX

Love Letter

• • • A man after our own heart is Bernard Mannes Baruch. When he was appointed to the job of handling postwar economic adjustments, Don James, our news and markets editor, telephoned him. He talked and Don listened. What was said appeared as a news story in the Nov. 11 issue under the heading, "Baruch Favors Speedy Termination Policy."

Don then forgot all about it. But not Bernard Mannes Baruch. He just wrote Don a letter beginning:

> You are a most understanding individual. I reached this conclusion after reading your article. The second paragraph so succinctly expresses the situation which faces me. You interpreted exactly my reactions to the task ahead . . .
>
> Thank you for your nice article.

Nice guy, Barney Baruch.

Aptronyms

• • • A new bacteriologist at Wayne University, Detroit, is Dr. Buggs.

Harmony Brothers

• • • We reported recently that a sergeant we met on a train to Washington showed us a furlough signed by a Colonel Harmony, of the 271st Regiment, under whom until recently was a Lieutenant Melody. We now have a letter from L. D. Harmony, sales manager of the Streine Tool & Mfg. Co., New Bremen, Ohio, informing us that the Colonel is his brother, that he has been in the army for 26 years, and has served in every rank from private to colonel, and loves army life.

All we can add is 'ray for Colonel Harmony. We hope he gets to be a full general. We also hope that at some place on the way up he was a bugler.

Pettays Want a Calendar

• • • Our mail this week is more varied than usual. Next is this plea from Mr. and Mrs. C. Pettay, 525A Steubenville Avenue, Cambridge, Ohio:

> I'm asking you if you do a favor for me and my wife. I want to get a nice calendar in New York in year 1944. We would like one that has a pretty scenery or something nice.
>
> P.S. Be sure to send us a nice calendar. So many thanks.—Mrs. Pettay.

With the paper situation precarious, we suppose calendars will be scarce this year. For ourself all we want is one with big dates and no pictures, and if we get any with big pictures and little dates tacked on as an afterthought, off they will go to the Pettays.

If you get any you don't need, you might help. The lush nude type, beloved of service stations would, of course, be out of place, as also would be the "our-factory-in-1910-our-factory-in-1943" kind. Try for mountains or meadows, preferably with animals.

Up the Ladder

• • • When we are in an expansive mood we are fond of saying that many people owe their success to faithful reading of your favorite family journal. But if you asked us to name one, for the life of us we couldn't. That, however, was yesterday. Today we can, as Mrs. Olive K. Nesbitt, who has just been made assistant of the Erie (Pa.) Public Library's new Technology Division, writes:

> The Iron Age is to be congratulated because I have a new position, and no doubt it can be traced to my continued interest in your publication, as I prepared it for binding year after year, and snatched a few minutes of library time to look at it, becoming as a result a devotee of Iron Age.
>
> Though many other technical magazines also passed through my hands, it was Iron Age which intrigued me. It "has what it takes."

Labor omnia vincit.

No Ulcers for George

• • • Our first Christmas card this year came from our friend George R. Woods, New York manager of R. S. Stokvis & Zonen, the machinery and equipment firm whose headquarters are in Rotterdam.

The card lists bravely the four offices—Rotterdam, Paris, Brussels, and New York, with nary a hint that only one remains in free territory. George always looks as if he had just hit a four-horse parlay on the nose. His lip dihedral is never less than a four-engine bomber's. "Don't you ever worry," we asked him, "about the situation abroad?" "Worry," sezzee, "I leave to the worriers."

But in '44 Stokvis celebrates its 100th anniversary, and a suggestion of why it has outlasted a half dozen wars is in this quotation of Lowell's that appears on the card:

> *Nor attempt the Future's portal*
> *with the Past's blood-rusted key.*

There Are No News

• • • The South African member of this page's loyal army of eighteen readers, R. W. Osborn, of Pretoria, reminds us that the singular use of the word "news" always infuriated Horace Greeley. He insisted that it is plural ("News this week are scarce"), and, of course, was right, for in the early days of publishing a "new" was short for "a new happening." Many brief items strung together were "news."

Which makes us question *Printers' Ink's* pluralizing of "shopping news" in this sentence, "*WPB now prohibits establishment of new shopping news without its permission.*" We think it should be "new shopping newses."

"This Is Mr. B-A-Y . . ."

• • • Speaking of four-horse parlays, a firm in Haverhill, Mass., is named Bailey & Bayley. Will one of the master minds figure out what the probabilities are of two men, whose names sound the same but are spelled differently, becoming business partners. Our guess is that the odds run into light years.

Graft Rears Its Ugly Head

• • • A small manufacturer in Long Island City, who telephones our technical editor, Frank Oliver, regularly for information, said the other day, "*Thank you again. We just got our Army-Navy E. A great deal of the credit goes to you. We don't know how to repay you.*"

"I'll take a cigar," Frank said jokingly. The next morning a whole box came by messenger. He passed them around, which gave rise to the rumor that again Frank has had to dust off the bassinet. There is no truth in this. The fathers of new babies, both boys, are your favorite family journal's managing editor, Tom Lippert, and news man and market editor, Don James.

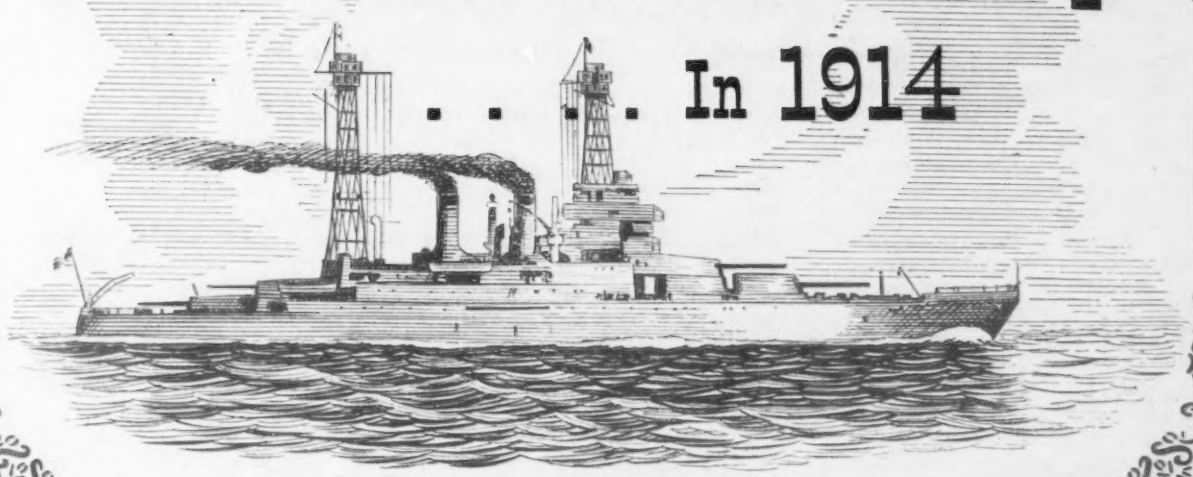
Puzzles

• • • Last week's victims are in these places: 4, 10, 15, 20, 26, 30.

A less than 20-min. answer to this means you are artillery officer material:

> *A Grand Rapids factory makes 6 kinds of bedroom suites, whose prices are $231, $273, $429, $600.60, $1,001, and $1,501.50. A buyer placed an order that totaled $13,519.90. How many of each kind of suite did he order?*

She Was A Good Battleship . . . . . In 1914



CRANE BUILDING *has advanced too*

Queen of the fleet in 1914, it was the best that naval engineering could produce. But it can't compete today with swift modern war greyhounds. Improvement has overtaken it. While it is still seaworthy, it is too slow and unwieldy for modern battle.

Cranes have improved too. Those old cranes you may have may be perfectly sound—almost as good as the day you bought them. But they are too slow and unwieldy to keep up with the production speed of the rest of your equipment.

You can increase your plant production—reduce handling costs, by replacing them with new Northern Cranes. These are faster, more powerful, stronger, have finer control, require much less attention.

MODERN NORTHERN CRANES SPEED PRODUCTION

Faster material handling in greater volume increases production of your whole plant—quickly pays the cost of new Northern Cranes.

Write for details on Northern Cranes—Northern Super-Cranes—Northern Hi-Lift (Low Headroom) Cranes.

Northern ENGINEERING WORKS

General Office: 2613 Atwater Street, DETROIT, MICH.

NORTHERN CRANE & HOIST WORKS, Limited • WINDSOR, CANADA

Offices at: 913 South 38th St., BIRMINGHAM • 53 West Jackson Blvd., CHICAGO • 2428 Spring Grove, CINCINNATI • 5724 Navigation Blvd., HOUSTON • 44 Whitehall St., NEW YORK • 555 Union Trust Bldg., PITTSBURGH • 4135 Gratiot Ave., ST. LOUIS • 1679 University Ave., ST. PAUL

The fine machine tool of overhead cranes built for heavy duty, 24-hour-a-day jobs.

NORTHERN SUPER-CRANE

Dear Editor:

HIGH SPEED MILLING

Sir:

We were extremely interested in your Oct. 14 article, "High Speed Milling in Aircraft Production," and your Nov. 11 article, "Machining and Forming 14ST Aluminum Alloy." In the latter you refer to these treatises, "Treatise on Machining, Bending and Straightening Aluminum Alloys," by G. R. Gwynne; "Machinability and Formability of 14ST Extrusions," by Homer Brown, and "Forming and Machining Characteristics of 14ST Extrusions," by W. T. Leonard.

Will you tell us where we could obtain copies of these?

R. A. SMITH,
Deputy Director Machine Tool Div.
Commonwealth of Australia,
War Supplies Procurement,
1700 Massachusetts Avenue, N.W.,
Washington 6, D. C.

● Write to James L. Straight, Executive Secretary, Aircraft War Production Council, 7046 Hollywood Blvd., Los Angeles.—Ed.

ELECTRIC-FURNACE BRAZING

Sir:

We would like a copy of your article describing a new type of welding process. This involves the application of a copper compound paste at the joint to be welded. The assembly is then passed through a special controlled atmosphere oven. Upon emerging from the oven the assembly is completely welded.

J. M. ALLGAIER
Owens-Illinois Can Co.,
6501 W. 65th St.,
Chicago

● You probably refer to the series by H. M. Webber of General Electric Co., published in The Iron Age from Sept. 8, 1938 to Mar. 16, 1939. It was reprinted in a 50-page booklet entitled "How and Where to Use Electric-Furnace Brazing." We believe General Electric Co., Schenectady, N. Y., can still furnish copies.—Ed.

GENEVA WORKS

Sir:

Have you published any information on the new steel plant just completed below Salt Lake City? Can you tell us, in round figures, the prewar steel production, and present production? How close is present production to present maximum capacity?

S. CLEMENTS HORSLEY
Horsley Co., Inc.,
18 East 48th St.,
New York

● In the Sept. 23 issue, page 85, we published a 1000-word article about the Geneva Works which included tables of assembly costs of materials, freight rates, annual capacities and other data.

National output of ingots and steel for castings in 1939 totaled 52,798,714 net tons; in 1940, 66,982,686 net tons; in 1941, 82,839,259 tons; in 1942, 86,031,931 tons. This year production will be around 89,000,000 net tons. Steel capacity as of July 1, 1943 was 90,346,120 net tons. The total including steel casting capacity by steel producers was 90,881,210 tons.—Ed.

CYCLOGRAPH

Sir:

Please advise us where we may purchase the Cyclograph described in the Nov. 4 issue.

RICHARD S. WHITTAKER
General Motors Corp.,
13400 West Outer Dr.,
Detroit

● Allen B. DuMont Laboratories, Inc., Passaic, N. J.—Ed.

SEAPORCEL

Sir:

Please advise us where more information can be obtained regarding Seaporcel, a fireproof ceramic (glazed) coating that does not char, chip or crack, and can be cut or tack-welded like uncoated metal, as mentioned in the Oct. 21 issue.

A. E. FLOWERS,
Engineer in Charge of Development
DeLaval Separator Co.,
Poughkeepsie, N. Y.

● Communicate with J. A. Stewart, 209 Fourth Ave., Pittsburgh.—Ed.

TURNINGS

Sir:

We have been struggling with the problem of handling turnings and would like to have the assistance of a firm making turning crushers. Also the names of firms making blowing systems for blowing the turnings and builders of the hoppers in which the turnings are deposited.

W. WALLACE McKAIG
Cumberland Steel Co.,
Cumberland, Md.

● Two manufacturers of chip crushers are Jeffrey Mfg. Co., 956 N. 4th St., Columbus, Ohio, and American Pulverizer Co., 1249 Macklind Ave., St. Louis. National Conveyors Co., 50 Church St., New York, installs systems for handling turnings. They also design and fabricate the hoppers or bins in which the turnings are deposited.—Ed.

ENEMY PATENTS

Sir:

Is it possible to inspect copies of seized enemy patents or must they be purchased first?

L. F. SMITH,
Manager
Lewis Machine Co.,
202-204 Joplin St.,
Joplin, Mo.

● Copies of seized patents can be obtained from the Commissioner of Patents, Washington 25, D. C. Most cost 10c each, the exceptions 25c. Libraries of these patents may be inspected at Alien Property Custodian's offices on South La Salle St., Chicago, and 120 Broadway, New York. Reprints of the seized patents covering metal products, published serially in The Iron Age, are available, price 24c.—Ed.

STEEL DISTRIBUTION

Sir:

Have you any data on the present channels of distribution of steel in the United States by product and consuming industry?

F. F. FOSS
Wheeling Steel Corp.,
Wheeling, W. Va.

● We are in the process of assembling data and are preparing a report which will appear in our Jan. 6 issue.—Ed.

ORCHIDS

Sir:

Mr. James is a most understanding individual. I reached this conclusion after reading his signed article on page 96 of your Nov. 11 issue. The second paragraph expresses so succinctly the situation which faces me.

Moreover he interpreted exactly my reactions to the task ahead. Yet we must not be too melancholy over the outlook. We know that with the gradual return to peace and demobilization, there will be loud outcries and protests—perhaps even more vociferous than were the complaints about the interferences and dislocations consequent to the mobilization for war.

So far as I am concerned, the matters of prime importance will be the termination of contracts, the care of surpluses, the warehousing of such surpluses, plant disposal and the matter of unemployment and severance wages.

We must determine too what powers shall remain in the Executive when peace comes and what further authority shall be conferred upon him, for what period and in what circumstances they shall continue in force.

BERNARD M. BARUCH
597 Madison Avenue,
New York 22

MACHINERY STEELS

Sir:

We have copies of your Tool Steel Directory, and would like to know if there is a publication of this nature on machinery steels.

R. J. JACK,
Purchasing Agent
Modern Tool Works, Ltd.,
Montcalm Avenue, York Township,
Toronto, Canada

● Write to American Society for Metals, 7301 Euclid Ave., Cleveland, for "Engineering Alloys," by Woldman and Dornblatt.—Ed.

POSTWAR ZINC OUTLOOK

Sir:

I have been hearing considerable discussion as to whether zinc is going to be used after this war is over in as large quantities as it was formerly during the 15 years prior to 1939. Have you prepared any information on the zinc outlook?

R. E. BURDETT,
President
American Crucible Co.,
Shelton, Conn.

● We have made no attempt to survey this situation, but in geenral our opinion is that zinc will survive the postwar era in exceptionally fine shape. There has been no product that threatens the position of galvanized metal, and the die casting of zinc alloys will very likely show an added spurt after the war.—Ed.

SOLNUS OILS

"eliminate high oil consumption . . sludge formation . . frequent overhauls"

Today, municipal equipment in defense areas is carrying "plus loads" that were never even dreamed of yesterday. Engines run longer, carry greater loads and need the right lubricant more than ever before.

The value of engineering "know how" plus the right lubricant was proved recently in a large pumping station in New England. The Winton Diesel engines—source of power for centrifugal pumps—were plagued with bad sludge formations, frequent overhauls and high oil consumption. A Sun Oil Engineer—one of those Doctors of Industry—studied the situation, recommended a change from a competitive lubricant to Solnus Heavy Medium Oil and that proved to be the answer!

Trouble stopped! According to latest reports all parts are perfectly lubricated . . . there are no carbon formations . . . engines are free of sludge . . . oil consumption is at a new low . . . and there hasn't been a replacement or overhaul since Solnus Oils were placed in service.

This is just another one of many cases that are constantly proving the value of these modern diesel lubricants and Sun Service. Both are yours to use to help keep your plant on a "victory schedule." Write for more information today . . .

SUN OIL COMPANY · *Philadelphia*

Sun Oil Company, Ltd., Toronto and Montreal, Canada

SUNOCO

SUN INDUSTRIAL PRODUCTS HELPING INDUSTRY HELP AMERIC

This Industrial Week . . .

- ***Labor Bucks Anew at Tapering of War Production***
- ***Many Other Conversion Problems Near; Facts Are Needed***
- ***Wage Sessions in Steel On; Retroactive Date Is Asked***
- ***Ingot Output Down Half Point; Flat Rolled Demand High***

INSTEAD of clarifying uncertainties troubling many industrialists, the numerous official statements issued recently covering war production seem to have increased confusion over the future pattern. One development clearly to be seen this week, however, is the increasing importance of labor's attitude in regard to the tapering of production.

The worker, like many another person, finds it hard to understand why basic production facilities should be curtailed when they could be shifted into civilian goods which are in such short supply. Management is unable to make adjustments freely because it is operating under war controls.

In the steel industry alone, this week, Philip Murray, head of the CIO, strongly urged that restrictions on civilian goods production be lifted. At the same time, a strike at the National Tube Co. in McKeesport started because the company ordered one of its four blast furnaces down for lack of orders. Other strenuous objections to temporary layoffs, and to the shifting and downgrading of workers have been voiced at other plants by the steel union.

Workers who have been commanding highly paid jobs are reluctant to take lower pay at humbler posts. While one steel plant in the Chicago area is laying off some of its men, the same company is conducting a drive to obtain more common labor. Meanwhile, in the same vicinity one aircraft engine plant has curtailed its production and another plant has dropped about 2500 workers.

A snag, and possible temporary stumbling block, in the initial stages of meetings between some steel companies and the United Steel Workers of America early this week, was the question of contract extension in case no decision is reached within the required number of days. The union was insisting that if no decision was reached, any extension agreed upon between the steel companies and the union should include provision for a retroactive date, covering any wage increases which might subsequently be granted, either by the company or the WLB. Steel companies, it is understood, were opposed to a retroactive date, but not to an extension because any price increase to offset rising costs, already encountered, plus any wage increases to be granted, would not be approved by the OPA in time to meet a retroactive wage increase.

The union planned to petition the War Labor Board for a continuation of its present contracts, in case no decision is reached by the time called for in the contracts, and is asking that such extension be accompanied by an agreement that wage increases be retroactive to the date on which present contracts would have terminated had there been no agreement or extension.

REPUBLIC STEEL CORP. met with the union on Monday and the meeting was adjourned on that day, subject to call. Meetings between Youngstown Sheet & Tube Co. and the union were in progress on Monday and Tuesday. U. S. Steel operating subsidiaries and other companies, such as Jones & Laughlin Steel, held their initial meeting on Tuesday of this week, while Bethlehem Steel Co. was scheduled to meet union representatives on Thursday. Demands of the union are substantially the same as those reported in this magazine Dec. 9, page 103.

Following the various major meetings and discussions, the cases probably will be cited for War Labor Board action. At the Weirton Steel Co., the independent union is asking wage increases 5c. per hour higher than the CIO is asking elsewhere.

The National Tube "cutback" controversy resulted in the idleness of blast furnaces, open hearths and a substantial portion of blooming mill operations. About 2700 tons of steel a day was being lost. During normal times, the company operates three blast furnaces at the plant, but war emergency work more than a year ago required the use of the fourth furnace. It was agreed with the union at that time that when the fourth furnace was no longer needed, certain reductions in personnel would be made.

Murray's statement concerning the need for removing restrictions upon civilian steel, issued on the eve of negotiations for higher steel wages, gave no recognition to the steel price factor. High cost and marginal plants, sustained for months by heavy demand and above-ceiling prices granted these individual mills, face difficulties now. Consumers are reluctant to pay higher prices when material can be obtained elsewhere.

Other problems which are sure to come in the transition from war to peace are being widely discussed, among industrialists. Alfred P. Sloan Jr., of General Motors Corp., estimated the cost of converting and re-tooling his corporation at $500,000,000.

UNIVERSALLY, industrialists are yearning for some word on which they can make firm plans to avoid choke points like those that delayed conversion to war production.

The problems may be classified broadly into cate-

News Highlights in This Issue

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gories such as manpower, materials, machinery, financing, and termination settlements. Much of the information is in the hands of departments at Washington which are reluctant at this time to reveal all they know.

Still another problem is that of surplus goods. Redistribution of idle and excess steel stocks, formerly the bailiwick of SRC but currently being handled through regional WPB offices, is reflecting a growing consciousness on the part of holders of large steel inventories toward early liquidation of oversupplies. This is working to the advantage of some civilian product manufacturers and is aiding many Class B producers in filling out allocations. Stocks throughout the country vary widely with areas reporting as low as 25,000 tons and up to the Cleveland district's 200,000 tons on list. One area reports satisfactory completion of 60 to 70 per cent of steel requests and actual redistribution is occurring at the rate of from 10,000 to 20,000 tons per month in various regions. Undercutting OPA prices has been prevalent in the sales of this material but has acted as an incentive to move undesirable grades and sizes. WPB, not actually entering into the sale, has no responsibility in the matter of price. Stringent WPB rules must be observed by both buyer and seller. Tool steel, narrow strip and some wire products are reported plentiful in such stocks. Some exporting of excess steel is also reported.

In steel, total order volume still is good, but the product mix definitely is different than it was a few months ago.

THE steel industry is seeing the paradox of large Naval and Army cancellations on one hand, while frenzied activity is occurring on specific items that are wanted immediately for certain rush projects. Plates, sheets, pipe and component parts for the expedited landing craft program are in great demand. But with certain other steel product's less tight and with Lend-Lease requirements down, the national ingot rate still is below the 100 per cent mark. The 30,000 new, all-steel freight cars which WPB has announced will be produced in 1944 will require approximately 450,000 tons of steel. Many of the cars already have been allocated among builders.

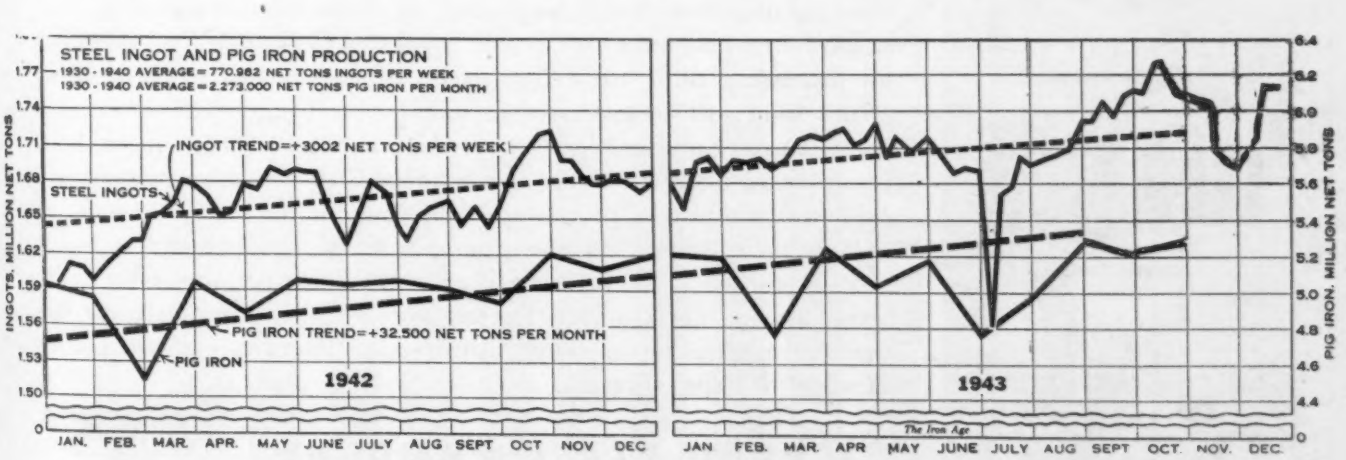
Mill inventories as a whole are building up rather rapidly in the Cleveland area, with about 75 per cent of these inventories in the form of ingots and the remainder as sem-finished and finished materials. Cancellations for the most part are for material that has not yet reached the production stage, so that there is little disruption of rolling schedules. Operations in the Cleveland and Youngstown areas are beginning to scale back up to what they were two months ago, but the slow down which started Oct. 10 at the Republic strip mill has not ended.

The second anniversary of Pearl Harbor was celebrated by 1000 men of the American Works of American Steel & Wire Co. by a walkout because they claimed they were overworked.

The DPC last Thursday formally notified the Geneva Steel Co. to halt construction of the structural mill, as indicated in this magazine last week. The first coke was made this week at the plant. The first pig iron is scheduled to be made later this month.

Other highlights of the week include the change in rules to assist the flow of cast iron scrap, the final total of 84,404,852 gross tons achieved by the Lake Superior iron ore vessel fleet; and the revelation that at least 217,000 tons of steel was lost in November due to the coal strike, a figure computed by projecting November production of ingots to a 31-day basis and comparing it with October.

NATIONAL STEEL ingot production declined half a point this week to 98.5 per cent of capacity. Youngstown operations have gained one and half points to 98 per cent while Cleveland output jumped six and a half points to 95.5 per cent. The operating rate in Detroit has increased three and a half points to 101.5 per cent. Declines are noted this week in Pittsburgh, down two and a half to 99 per cent; Chicago, down half a point to 102.5 per cent; Philadelphia, down half a point to 93 per cent as Pencoyd operations are tapered; Wheeling, down four to 95 per cent; Cincinnati, down nine to 95 and the Eastern District, down five and a half to 95.5. Buffalo at 99.5 and Birmingham at 99 are unchanged from last week.

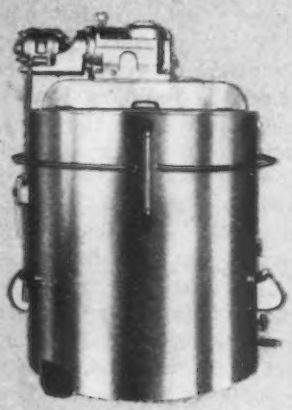

STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,982 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
INGOT TREND = +3002 NET TONS PER WEEK
STEEL INGOTS
PIG IRON TREND = +32,500 NET TONS PER MONTH
PIG IRON
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
1942
1943
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEPT OCT NOV DEC
The Iron Age

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
December 9	101.5	103.0	96.5	93.5	89.0	99.5	99.0	99.0	98.0	95.0	104.0	108.0	101.0	99.0
December 16	99.0	102.5	98.0	93.0	95.5	99.5	95.0	99.0	101.5	95.0	95.0	108.0	95.5	98.5

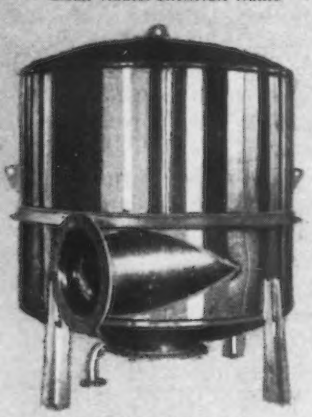
* Revised

Examples of Food Processing Equipment made from Jessop Stainless and Stainless-Clad Steels.



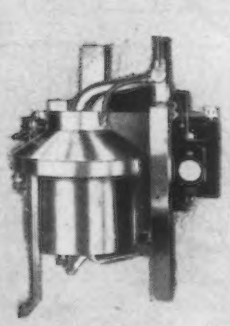
ELECTRIC KETTLE

GRAIN TRANSPORTATION TANKS

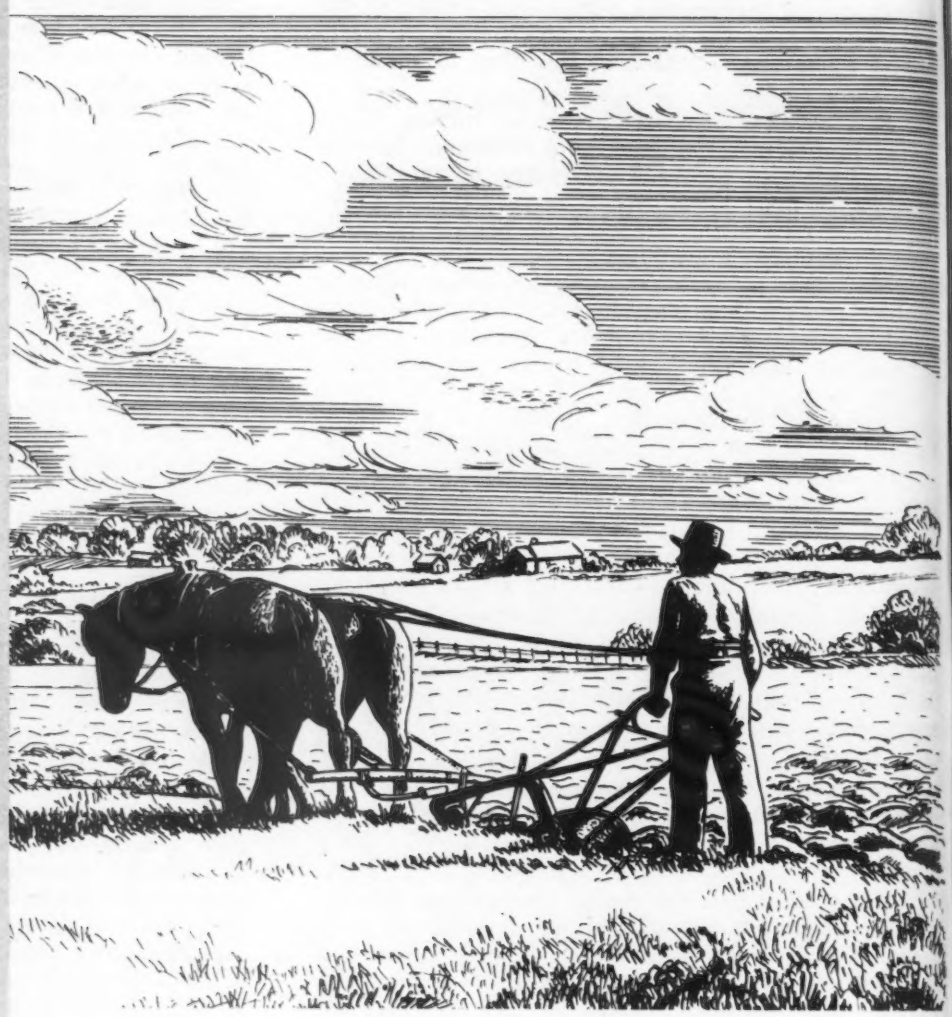


TANKS FOR MEAT JUICES

STORAGE TANKS



MILK IRRADIATOR



Food Fights For Freedom

The American Farmer is a vitally important War Worker. His record-breaking output of "Foods for Victory" is producing the largest supplies of food the world has ever known. Suggested 1944 goals for vegetables for processing alone are well in excess of 1943 record acreages. Most of this food will be processed in stainless steel equipment—having a corrosion-resisting, sanitary surface which maintains purity of product. Jessop Solid Stainless Steels and Stainless-Clad Steels are extensively used in fabrication of processing equipment for the food industries as well as many others. In the post-war world Jessop Stainless Steels and Composite Steels will find even more extensive applications for better living. These Jessop Electric Furnace Specialty Steels are the result of modern steel-making facilities and practices, combined with 42 years of experience.

JESSOP STEEL COMPANY

HEAD OFFICE AND WORKS

WASHINGTON . . . . PENNA.

WAREHOUSES: CHICAGO, CINCINNATI, CLEVELAND, DETROIT, HARTFORD, TORONTO

ARMY E NAVY

JESSOP STEEL CO. FINE JESSOP STEELS WASHINGTON PA.

Established 1901

Elimination of All Restrictions on Use of Civilian Steel Urged by Murray on Eve of Negotiations for Higher Wages

• • • **On the eve** of contract negotiations for higher wages, Philip Murray, CIO head and steel union chieftain, early this week called on WPB to remove all restrictions upon the use of steels for civilian purposes, in order to take up some of the slack resulting from war contract cancellations. Murray thus joined sides with the steel industry and steel observers who have repeatedly stated, privately or otherwise, that the lack of rapid channeling of steel into civilian fields would result in cutbacks of steel ingot operations.

According to Mr. Murray, open hearths are idle in four Republic Steel plants, and he pointed to the forthcoming shutdown of Carnegie-Illinois Steel Corp.'s Pencoyd plant near Philadelphia.

Strenuous objections to temporary layoffs and job transfers are being voiced by the union whenever steel companies find it necessary to curtail mill operations. The latest controversy arose Monday at National Tube Co., McKeesport, where the management decided to take off one blast furnace. Two crewmen were offered "down-graded" positions elsewhere. They went on strike, joined by other workers. As a result hundreds were affected by the stoppage. All blast furnaces, open hearths and a part of the rolling equipment were down.

"This is a clear cut problem," Mr. Murray told Donald Nelson. "Either the war agencies need all the steel that the industry can produce, or that portion of the industry's output that is not needed for war uses should be released for civilian uses."

Murray's stand brings into the open

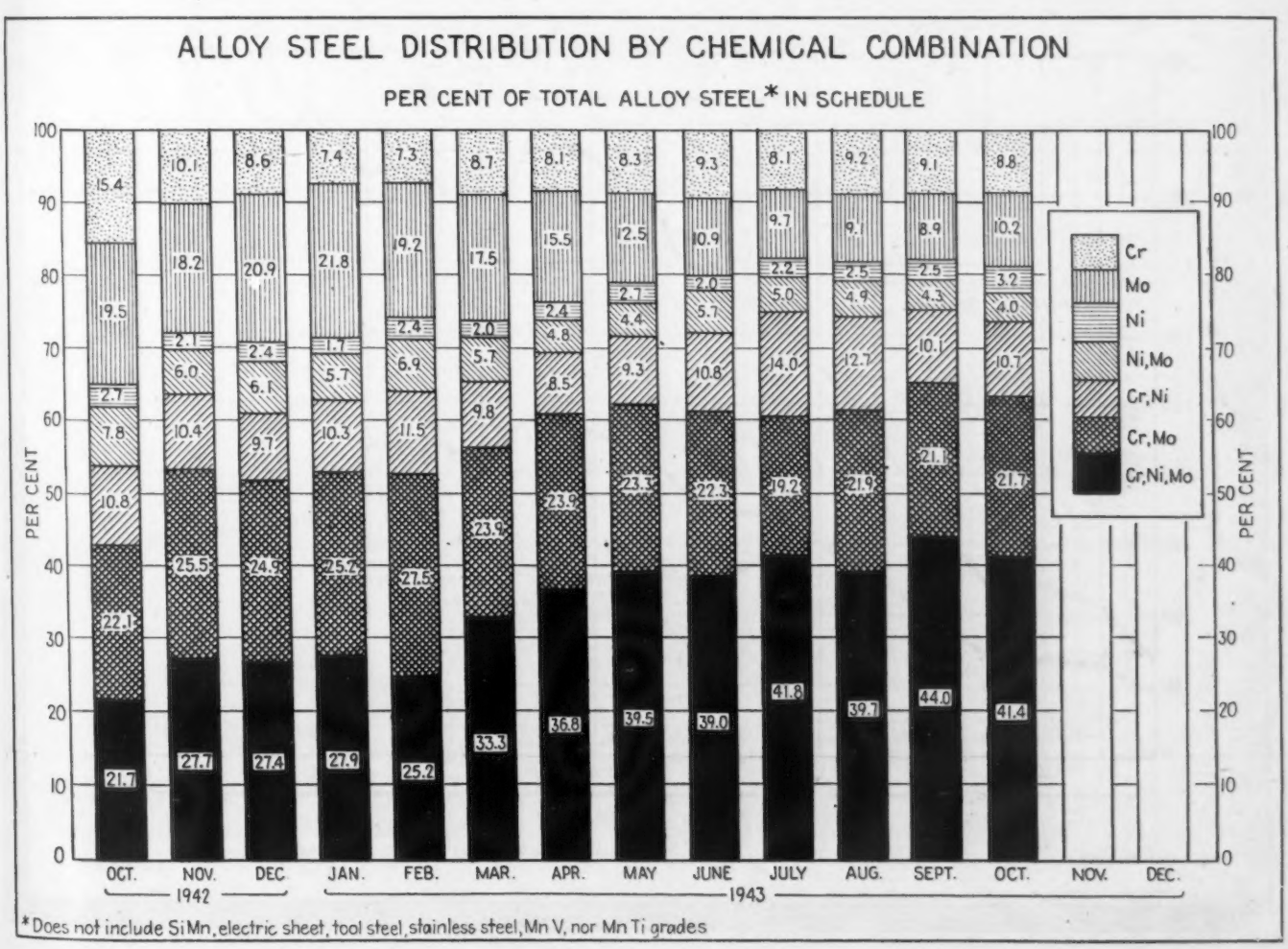
(CONTINUED ON PAGE 92)

Five Timely Charts

• • • *Below and on the two following pages are interesting data charted by the WPB Iron and Steel Division. Sharp changes in alloy steel distribution by chemical combinations which have occurred in the past year are shown below. Conservation measures forced a sharp drop in chrome and molybdenum grades. A very sharp rise in chrome-nickel-moly grades is depicted, reflecting the triple alloy scrap situation and the substitution of NE grades for the former high alloy content steels.*

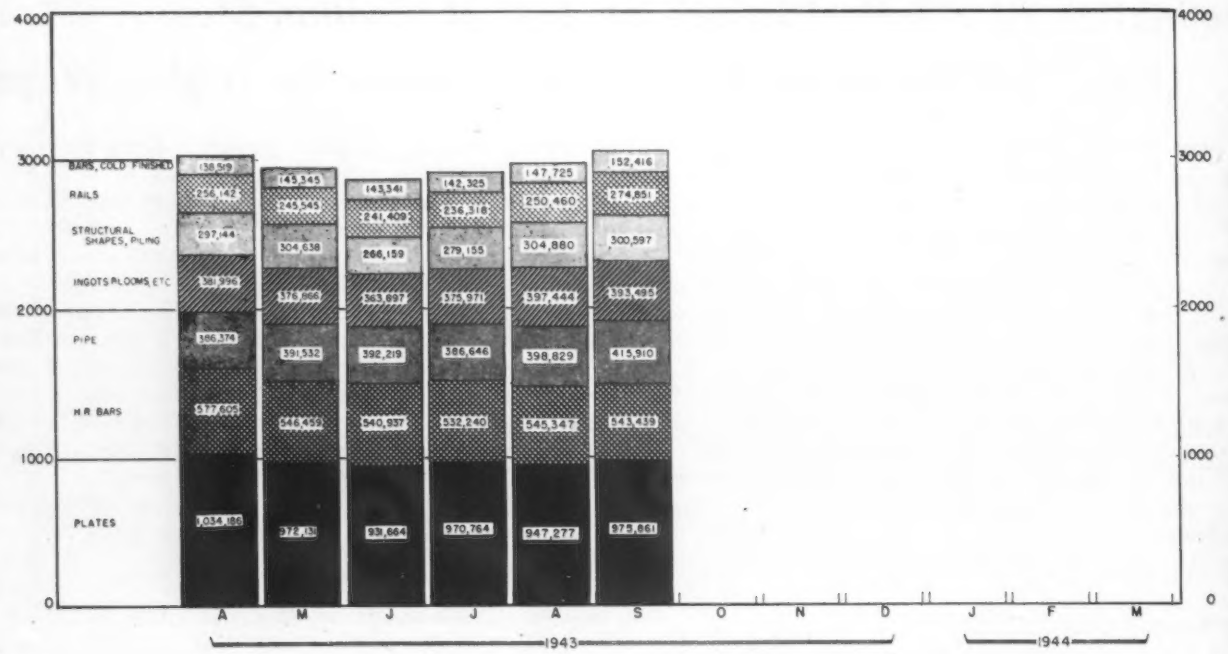
Changes in carbon steel and alloy steel shipments are shown on succeeding pages. Another of the charts shows the percentage of the steel expansion program placed in operation. In the issues of May 27, June 3 and June 10, the program was discussed in detail, with numerous charts and tables.

Note—In alloy steel shipment chart at top of page 91 July production of tubing should be 30,851.


ALLOY STEEL DISTRIBUTION BY CHEMICAL COMBINATION
PER CENT OF TOTAL ALLOY STEEL* IN SCHEDULE
PER CENT
Cr
Mo
Ni
Ni,Mo
Cr,Ni
Cr,Mo
Cr,Ni,Mo
OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1942
1943
*Does not include Si Mn, electric sheet, tool steel, stainless steel, Mn V, nor Mn Ti grades

CARBON STEEL SHIPMENTS BY PRODUCTS

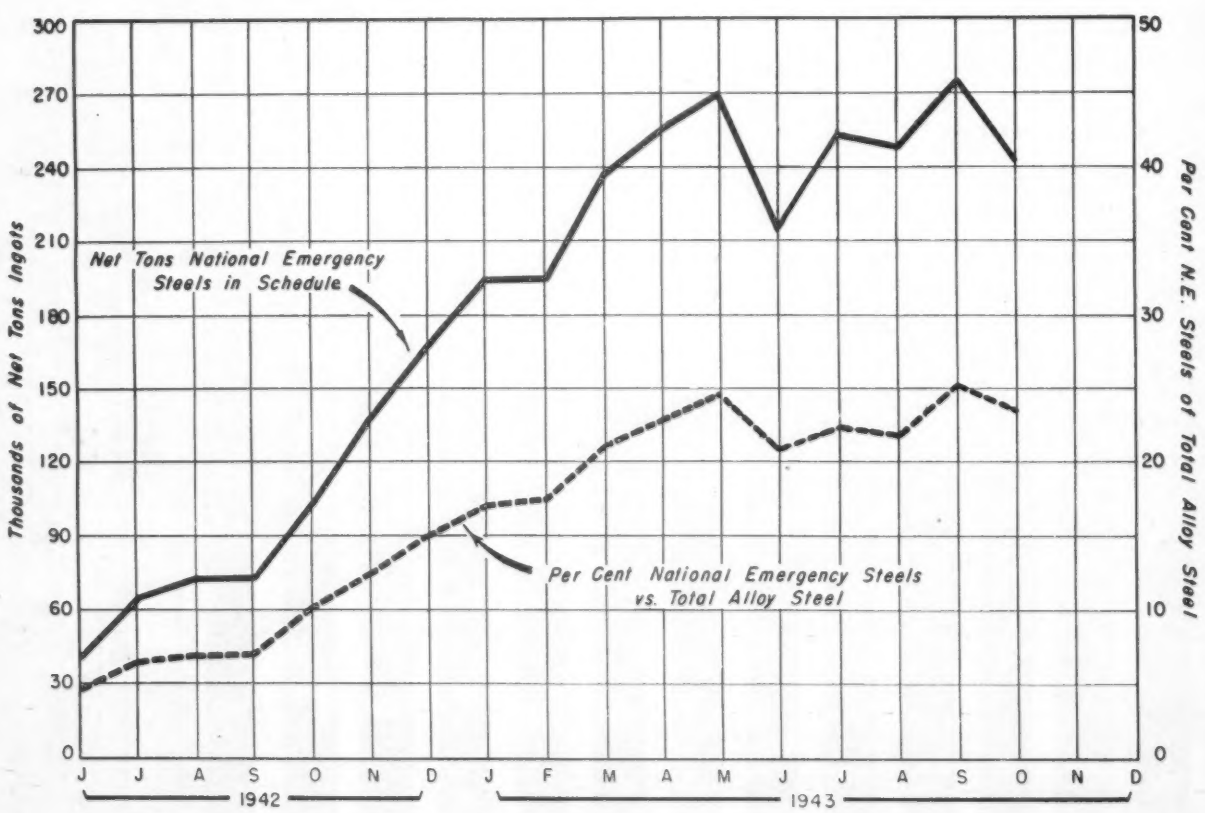
(INCLUDES ALL CONTROLLED STEEL PRODUCTS IN THOUSANDS OF NET TONS, EXCLUDES FURTHUR CONVERSION AND PRODUCERS' INTERCHANGE)



Source Steel Division

November 15, 1943

SCHEDULED PRODUCTION OF NATIONAL EMERGENCY STEELS



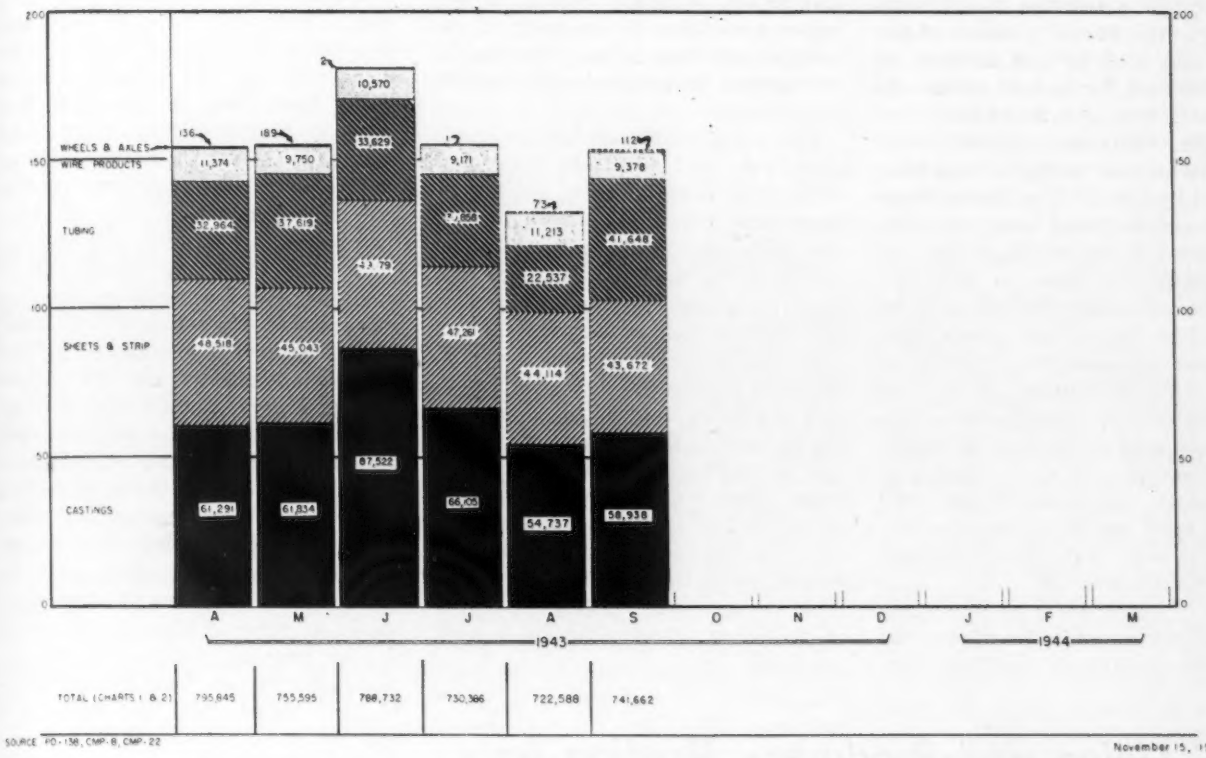
Source Steel Division

Note Includes only NE 8000-8900, NE 1300 & NE 9400, 9500 + 9600

October 20, 19

ALLOY STEEL SHIPMENTS BY PRODUCTS

(INCLUDES ALL CONTROLLED STEEL PRODUCTS IN THOUSANDS OF NET TONS. EXCLUDES FURTHUR CONVERSION AND PRODUCERS' INTERCHANGE)



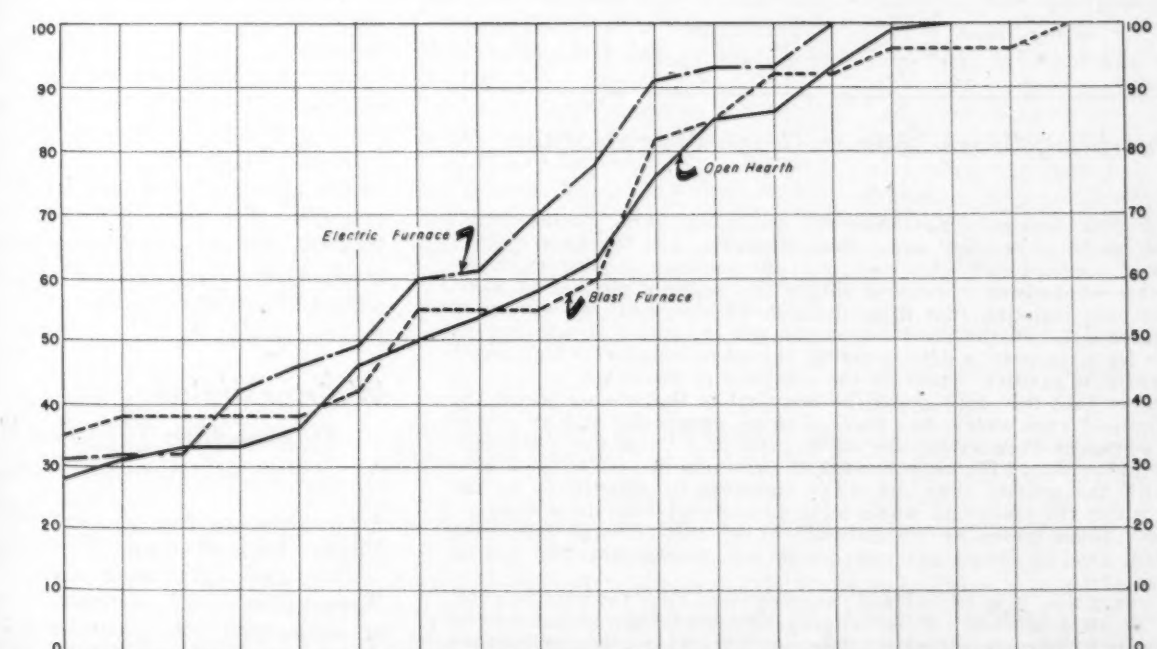
	A	M	J	J	A	S
TOTAL (CHARTS I & 2)	795,845	755,595	788,732	730,366	722,588	741,662

SOURCE PO-138, CMP-8, CMP-22

November 15, 1943

PERCENTAGE OF STEEL EXPANSION PROGRAM PLACED IN OPERATION

(For Blast Furnace, Open Hearth and Electric Furnace Projects Actual Prior to Oct 1, 1943–Estimated Thereafter, (Based on Scheduled Completion Dates as of Oct. 1)



	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Electric Furnace	31	32	32	42	46	49	60	61	70	78	91	93	93	100	100	100	100	100
Blast Furnace	35	38	38	38	38	42	55	55	55	60	82	85	92	92	96	96	96	100
Open Hearth	28	31	33	33	36	46	50	54	58	63	76	85	86	93	99	100	100	100

October 20, 1943

(CONTINUED FROM PAGE 89)

the fact that some other marginal plants or companies, which have been allowed by OPA, because of high costs to charge steel prices in excess of the ceiling, may soon be shut down or go out of business for lack of orders. As predicted before, it is understood that orders for ingots, semi-finished steel, and some finished products, have been cancelled by the WPB at those plants where premium prices have prevailed. The policy of the WPB, while not made public, has been to withdraw directives or orders for material at higher than the ceiling price, when such products could be obtained at ceiling price quotations. Several of the smaller plants already have been substantially affected, from an operation standpoint, and as the supply of steel ingots and semi-finished steel becomes more plentiful, these particular plants will have their schedules more seriously affected.

Many of these above ceiling products had been slated for lend-lease, but it is understood that lend-lease tonnages from here on out, involving steel products, will be only a fraction of what they had been. It is obvious that no steel company, which charges higher prices than the majority of the industry, can hope to get orders on its books, when lower prices are available elsewhere.

The significant part of Murray's statement rests with the fact that while he is negotiating to get higher wages and other concessions, some of the high cost and marginal steel plants, which were brought back into operation at the beginning of the war, now face complete or partial shutdown unless WPB works out some program. Murray's statement does not recognize the price factor, which, simply stated, is that these plants were only able to maintain production—first, because they were allowed premium prices to take care of higher costs, and, secondly, because the war demand was so heavy that all the steel which could be made was needed, regardless of the price. This situation is now changing.

o o o

Steel Union and Producers Meeting on Demands; Difficult WLB Decision Seen

Pittsburgh

• • • **This time, there** are no "Big Steel" followed by "Little Steel" meetings. At various steel centers throughout the country, steel companies this week met with representatives of the United Steel Workers of America, to hear demands for wage increases, shift differentials, guaranteed wage payments, hours of work demands, etc. These demands were the same as those listed on page 103, Dec. 9 issue of THE IRON AGE.

Monday of this week, Republic Steel, Youngstown Sheet & Tube, and some other steel companies had their initial meeting. On Tuesday, United States Steel Corp. steel subsidiaries, Jones & Laughlin Steel Corp., and other steel companies had their initial conferences. On Thursday of this week, Bethlehem Steel Co. will have their session.

Generally speaking, from one to two days after the initial meetings an adjournment was expected to be asked for by the steel companies, to further study the demands and discussions occurring at the conferences. It is expected that both sides will consume, for collective bargaining purposes, the full number of days of negotiations allowed in their respective contracts.

Steel observers believe that following various major meetings and discussions, all union demands involving increased rates of pay, or added cost to the average wage pay, will be eventually turned down by steel companies. After this, the union will cite the cases for War Labor Board action. A WLB decision will be difficult, because practically all of the union demands spell disaster to the so-called "Little Steel" formula.

It is believed that some increase in the hourly rate will eventually be allowed, but not the 17c. demanded by the union. Some sources look for a maximum of eight cents an hour. The question of vacations, separation pay for permanent plant shutdowns, and grievance machinery revisions, may receive positive action without WLB approval, although the separation payment for permanent shutdowns might be eventually dictated by the United States Government.

Stumbling Block Seen in Union Negotiations

Pittsburgh

• • • A snag, and possible temporary stumbling block, in the initial stages of meetings between some steel companies and the United Steel Workers of America early this week, was the question of contract extension in case no decision is reached within the required number of days. The union was insisting that if no decision was reached, any extension agreed upon between the steel companies and the union should include provision for a retroactive date, covering any wage increases which might subsequently be granted, either by the company or the WLB.

The union held this date should be identical to the one on which the contract would have ended, had there been no agreement and an extension. To protect themselves, the union early this week had petitioned the War Labor Board for an extension of contracts in case of no agreement, with the proviso that any wage increases be retroactive to the date on which the contracts would have terminated, had there been no extension. These moves were apparently to not only forestall a possible strike, but, also, to insure pay increase if any, dating from the end of the old contract.

Steel companies, it is understood, were opposed to a retroactive date, but not to an extension. It is believed they feel that in case wage increases are granted, a retroactive date would result in a loss of millions of dollars, because any price increase to offset rising costs, already encountered, plus any wage increases to be granted, would not be approved by the OPA in time to meet a retroactive wage increase. A retroactive price increase would be meaningless on shipments that had already been made, and would only practically apply on material not already shipped at the time a price decision was handed down. If past experience is any criterion, it would take several months before steel companies could present data and the OPA could hand down a decision.

•

Weirton Union Demanding 22c. Per Hr.

Weirton, W. Va.

• • • **When the Weirton** Independent Union, Inc., covering 10,000 mill workers and 1200 salaried workers at Weirton Steel Co.'s plants here and at Steubenville, Ohio, demanded 22c. an hour above the present rate, or 5c. more than the CIO had asked, it was disclosed that the Weirton union had been negotiating with T. E. Millsop, Weirton Steel president, since Jan. 12, 1943.

The Weirton union has demanded that any increases which are granted

be retroactive to Dec. 1, 1943. Phil Murray's United Steel Workers of America have also demanded that contracts continue during negotiations, and that any wage increases granted be retroactive to the date of the demands.

It works this way: Murray has proposed a 5c. an hour increase for the afternoon shift and a 10c. differential for the midnight shift, with no differential for the day shift. With more than a majority of steel workers on swing shifts, the average hourly increase, in case the afternoon and evening differential should be granted, would be slightly less than 5c. an hour for all three shifts.

o o o

450,000 Tons of Steel in Car Program

Washington

• • • **Many of them** already allocated among builders, the 30,000 new, all-steel freight cars which WPB has announced will be produced in 1944 will require approximately 450,000 tons of steel. While the great bulk of the tonnage will be plates, other sizable requirements will include sheets, forgings and castings.

A partial breakdown of the equipment follows: 12,070 hoppers; 7780 box cars; 3850 gondolas; 1017 flat cars; 700 refrigerator cars; 500 ore cars; 310 cabooses; 500 gondola bodies; 105 tank cars; 100 automobile box cars; 75 hopper bodies; eight dual capacity flat cars and four dump cars. There is also an estimated carryover from 1943 to 1944 of about 90 gondolas, 50 hoppers and 50 box cars, which may be increased. WPB said that the new cars had been made possible by an available supply of steel and will be known as the "Victory" design.

Total production of freight cars for domestic use, including the composite model and the new Victory design, which will go into production next June, will be approximately 50,000 for 1944, according to L. L. White, Director of the WPB Transportation Equipment Division.

o o o

OPA Announces New Ore Schedule

Washington

• • • **OPA on Wednesday** formally announced its new iron ore schedule, effective at once, continuing a ceiling price of $4.45 per gross ton for standard Mesabi non-bessemer ore produced in the Lake Superior district. Announcement that the base price had been continued but that the "freezes" had been removed was made in THE IRON AGE of Nov. 18, page 94. OPA said that the ceiling price for ore delivered at lower lake ports is approximately 15c. a ton above the "freeze" maximum prices averaging $4.30 a ton which had been in effect since the shipping season of 1941.

The new ceiling prices are applicable to settling of accounts for all ore shipped during 1943. OPA said the increase was necessitated by rising costs, particularly higher labor expenses. A ceiling of $4.75 per gross ton had been recommended by OPA's Iron Ore Advisory Committee. The usual differentials were maintained.

o o o

WLB Clarifies Wage Cuts, Christmas Bonuses

Cleveland

• • • **The wage stabilization program,** according to the fifth regional War Labor Board, is not a one way street. Wage decreases are just as illegal without WLB approval as are certain wage increases. In two cases involving Ohio companies, it was pointed out that Executive Order 9250 issued in accordance with amended Emergency Price Control Act of Congress, which stabilized prices and wages, clearly states that wage rates may be neither increased nor decreased without WLB approval.

•

• • • **Any employer that,** in paying Christmas bonuses, absorbs the 20 per cent withholding tax so as to give employees the same amount of bonus as received last year is violating the wage stabilization laws. Regulations provide that employers may pay the same amount of bonus or the same per centage as was legally paid last year without obtaining WLB approval, but the amount withheld for income tax purposes or any other taxes deducted must be considered part of the bonus paid.

•

$3,000,000 in Bonuses Distributed by Lincoln

Cleveland

• • • **Around** $3,000,000 in cash bonuses were distributed by the Lincoln Electric Co. on Dec. 11, to some 1300 employees. These year-end checks ranged from $25 in the case of a newcomer to $50,000 in the case of an engineer whose genius produced a new type of welder that cut production costs by nearly 50 per cent.

Of the $3,000,000 distributed, about 90 per cent went to factory employees and office workers, with payments computed on the same basis as in the past 10 years since the incentive plan was inaugurated. This plan considers the total yearly earnings of each employee, combined with the number of years of service and the development of the employee.

Saying that he refused "to renegotiate his workers" despite renegotiation proceedings now pending between the company and the Navy, J. F. Lincoln, president, stated that the year-end incentive bonus averaged over $2250 per employee. Since the beginning of the Lincoln bonus plan in 1934, about $12,000,000 has been distributed to employees.

OPA Grants Further Coke Price Increases

Washington

• • • **Due to increases** in coal prices on Nov. 29, OPA has just granted a further increase of 30c. a ton in the prices of by-product coke in the middle West and has also authorized an increase of 50c. a ton for machine drawn and 75c. a ton for hand drawn coke, Connellsville, Pa., ovens. The added price in mid-west by-product coke prices brings to $1.10 a ton the increases recently granted on the coke. The increases in Connellsville beehive coke brings machine drawn fuel up to $7 and hand drawn coke up to $7.75, ovens.

COMING EVENTS

Jan. 10 to 14, 1944—Society of Automotive Engineers, Detroit.
April 2 to 5—The American Ceramic Society, Inc., Pittsburgh.
April 12 to 15—The Electrochemical Society, Inc., Milwaukee.

Wilson of WPB Sees 1944 War Output Considerably Higher Than Goals of '43

• • • **The 1944** war production program as it stands now will be considerably higher than the 1943 goal, according to C. E. Wilson, speaking in New York last week before the National Association of Manufacturers.

Wilson warned strongly against over-optimism. He exhibited the charts which are shown on this page, indicating the production program for 1944 as far as it can be anticipated.

The NAM, led by F. C. Crawford, adopted a 1944 platform which reiterated its pledge of full wartime production for victory and which added a new post-war program. The peacetime pledge calls for doing everything possible "to produce and distribute better goods, in greater volume, at lower prices, to more people, to make opportunity and jobs available to everyone, to help restore and preserve freedom."

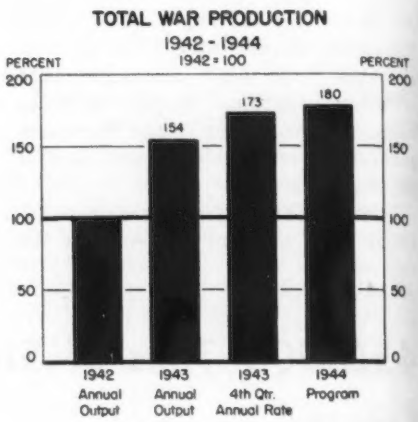
The prompt adoption of these five governmental policies for the transition period between wartime and peacetime production was urged: Ending of wartime controls as soon as practicable; reduction of wartime taxes; prompt payment by the Government when it cancels wartime contracts; no governmental operation of plants in competition with private industry; no dumping of surplus war goods on the market.

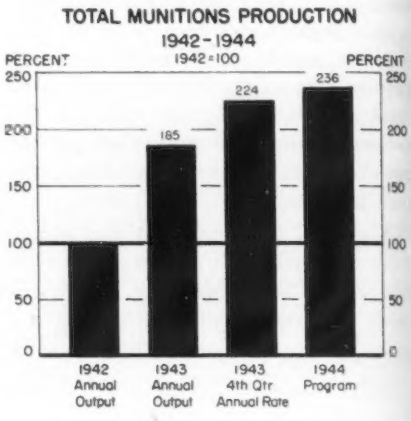
Tom Girdler told the conference of the need for cooperation between industry and labor, one of the prime requisites for success in the post-war period. H. W. Prentis, Jr., of Armstrong Cork, warned that business will have hard work to loosen the "throttle hold" upon it. W. P. Witherow, president of Blaw-Knox, urged America not to fear the industrialization of other nations that the war is bringing. Paul G. Hoffman of Studebaker and chairman of the Committee for Economic Development, predicted post-war production at least one-third higher than 1940 output.

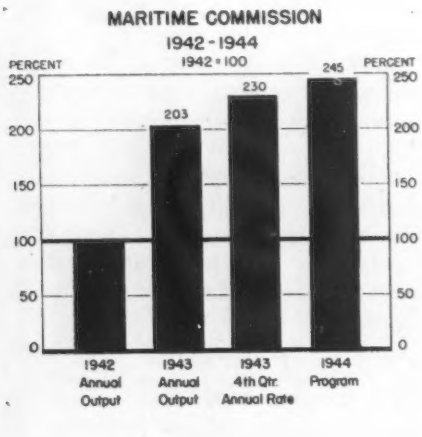
Wilfred Sykes, president of Inland Steel Co., told the conference that preserving private enterprise at home after the war is just as important as preserving peace abroad. Discussing transition problems in the switch from war to peace, he pointed out that the government has some responsibility to give competing firms a fair, clean, equal start.

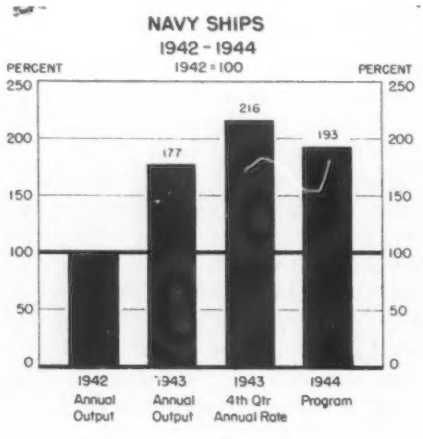
Robert Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill., was elected president of the association, succeeding Mr. Crawford.

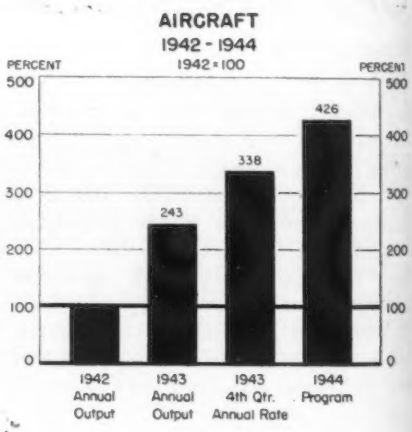
Mr. Gaylord, a graduate of the University of Minnesota, joined Ingersoll as vice-president in 1917. He was elected president of the company in 1928. Mr. Gaylord has been a member of the executive committee of Machinery and Allied Products Institute since 1934, and has been vice-president since 1937. He is a director and officer of the Illinois Manufacturers Association, having held office as president in 1941 and chairman in 1942 and 1943.

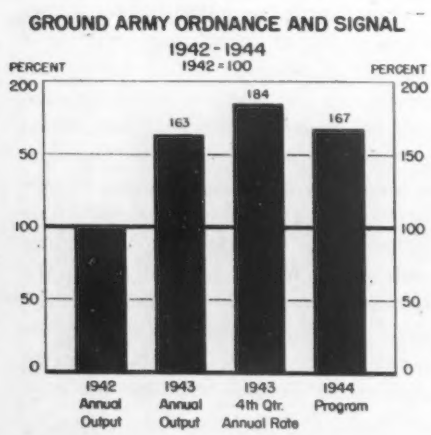


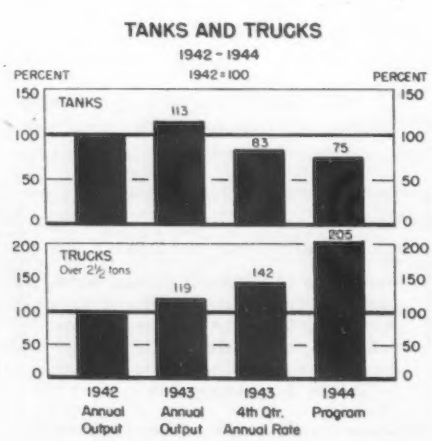


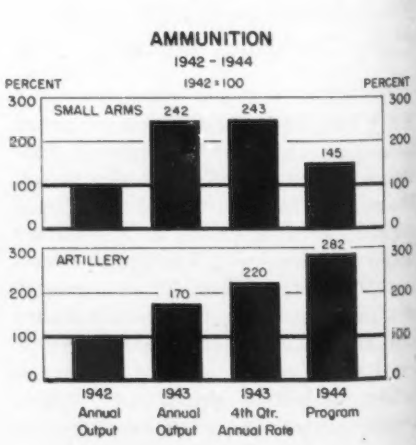












2500 to 3500 Tons of Excess Steel Per Week Being Requested at New York

New York

• • • **Evidence that holders** of large steel inventories are becoming increasingly aware of the financial dangers of emergency liquidation in the event of a sudden victory was presented indirectly in the remarks of Walter J. Stein, regional head of the Steel Branch, Redistribution Department of the local WPB, when interviewed last week by THE IRON AGE.

According to Mr. Stein the larger steel holders predominantly are becoming conscious of inventories and are moving quantities of material through the redistribution proceeding to other less fortunate consumers . . . often at below ceiling prices. Mr. Stein said many sales are "shading" mill prices and ceilings. However, it was emphasized, much of this practice can be attributed to the fact that most excess stocks are of a cat and dog variety which more or less demand expediting to move. Price cutting has been the incentive to the buyer for accepting odd sizes and unwanted grades.

Likewise, removing all blame for under-market price cuts from the WPB, Mr. Stein pointed out that the Redistribution Department actually sells nothing. It only locates stocks and potential buyers and brings the two together for consummation of a sale by negotiation. WPB plays no part in the sale and operates much the same as SRC did prior to its liquidation.

Mr. Stein emphasized that the position of the WPB in the matter of redistributing steel was a paradoxical one in which all movement of material was accomplished entirely from records and no actual sale was ever made. WPB never holds title to the steel nor drives a bargain for its sale.

Questioned on the volume of material being handled by the New York regional office, Mr. Stein said that from 600 to 700 requests for individual items totaling from 2500 to 3500 tons per week are received and from 60 to 70 per cent of these were being filled satisfactorily. He made a point here that the efficiency and speed with which the department can handle requests depends entirely upon the completeness of reporting by steel holders. He indicated that while reports were in good volume more was to be desired.

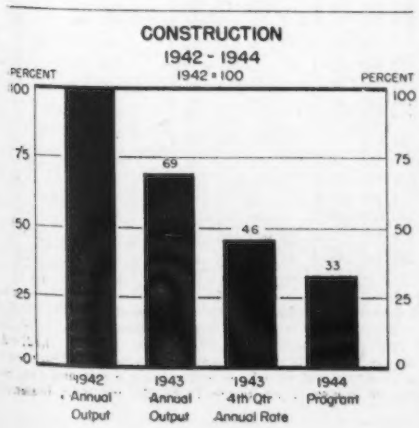
Requests for most items currently are being handled by this office in about 24 hr. This carries the matter as far as locating the desired material and notifying the buyer and seller. Final consummation of the sales, of course, depends on the alacrity of the negotiators for the material, in which the department plays no part.

Volume of steel movement from distressed or excess stocks through the department was reported as averaging about 5000 tons per week at present and actual records of inventories in the New York area constituted about 25,000 tons of all types. While listed stocks were described as mainly of off-size and grade material an excessive amount of tool steel was noted. Recently exporters have begun buying excess tool steel for export to South America, Mr. Stein said.

Heaviest demands by type of product have closely followed the market trends. For instance the presently most popular demand is for sheet and plate while six months ago the demand was for alloy grades. Present demand is also heavy for low carbon bars and flats.

Asked about the potential volume of excess and distressed stocks which might be put up for redistribution in the area, Mr. Stein said that no conclusion could be drawn as the extent of contract cancellations would determine this mainly in the future and that this was so far an unknown factor. He reported that contract cancellation results were not being felt heavily yet in this area.

While no estimate could be given of the amount of redistributed steel going into civilian production in the area, Mr. Stein said that it was a "substantial" percentage.



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More Excess Steel Available; Civilian Goods Makers Seeking It

Detroit

• • • **Excess steel** listed in the Detroit regional office of the WPB has in the past amounted to about 4,000 tons. Redistribution has been at the rate of about 2,000 tons per week. In the past several weeks both of these quantities have increased, with redistribution here during the last 30 days coming to around 12,500 tons and availability increased about in proportion. This increase in availability, however, does not represent a trend so much as it does cancellations of one or two specific contracts which stepped up the indicated few thousand tons.

The increase in redistribution is attributed by people here at WPB to two factors: First, many B producers under CMP are filling out their allocations through the redistribution branch, which provides a short-cut for them. Second, some producers (civilian) are scanning the lists, finding steel of their particular specifications and shapes on hand for perhaps several months, then going through the appeal procedure to obtain such steel for their civilian production.

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Prices Well Below Market Reported

Pittsburgh

• • • **Excess steel stocks,** as a result of cut-backs or cancellations, are no problem yet in their producing area, but there is a lack of enthusiasm being expressed by potential buyers of this material.

Nevertheless, stocks which have shown up in this territory have been disposed of quickly by the Pittsburgh district Ordnance offices, and any material which after the 20-day lapse went under supervision of the local WPB office, has also been disposed of.

Both Ordnance and WPB officials here, however, expect that the disposal of, and the distribution of, excess steel, due to war contract cutbacks,

may move at a much slower pace in the future. It is pointed out that the same factors, with respect to inventory scrutiny now prevalent in the steel industry, are also active in those steel markets involving the sale of steel, resulting from contract cutbacks. As a matter of fact, the sphere of potential customers for excess steel inventories has contracted substantially, since the greatest field for this material had been prime and subcontractors turning out war business.

WPB officials believe that in order to expedite the disposal of excess steel inventories, ordnance officers should not take full advantage of the 20-day period which they are allowed before WPB takes over the disposition of the material. It is believed here that if WPB is notified as promptly as possible, in case the Ordnance finds no prospective home for the steel, there will be a better chance for getting rid of the material. This is said to be especially true in view of rapidly changing conditions.

Reports reaching here indicate that some stocks of excess steel, resulting from cutbacks in other territories, are being sold below the current market prices for steel. In some instances the difference is considerable. The amounts are said to be fairly large in some cases. Some lots involve 100 tons or more. Bars and cold rolled sheets have figured in some deals.

Some other ordnance areas are said to be quite liberal in their choice of prospective buyers, who are alleged to be not always bona fide or legitimate warehouse interests. The WPB has set up certain prescribed rules as to how excess steel may be taken in by prospective buyers. In the rush of attempting to dispose of excess stocks, as they pile up at an increasing rate, it is alleged that these rules are not always adhered to. Some steel is believed to be falling into the hands of curbstone brokers, who are using it to possibly disrupt some regular warehouse steel distribution.

Large manufacturing centers with war plants are expected to be hit harder than ever by cutbacks, with a resultant increase in excess steel stocks. An outstanding example of excess steel stocks, involving an odd size, and not readily usable by fabricators for other purposes, is material for 50-cal. bullet cores. This material is piling up at many places because of the substantial cutback on this program. Steel mills cannot utilize the material because of the size and chemical composition. The same situation probably applies to small arms and other type of ammunition.

Steel Employment Statistics Overhauled

Pittsburgh

• • • To more nearly approach actual conditions, which have become more complex because of force increases and turnover, the American Iron and Steel Institute will revise its method of computing the average number of employees on steel industry payrolls. This will result in a more accurate figure, for not only the average number of wage and salaried workers, but for the average rates paid and the

November Output of Steel Ingots Drops

YEAR 1943

Production of Open Hearth, Bessemer and Electric Steel Ingots, and Steel for Castings. Source: American Iron & Steel Institute

Based on Reports by Companies which in 1942 made 98.3% of the Open Hearth, 100% of the Bessemer and 87.6% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies: Open Hearth* Net tons	Open Hearth* Percent of capacity	Bessemer Net tons	Bessemer Percent of capacity	Electric Net tons	Electric Percent of capacity	Total* Net tons	Total* Percent of capacity	Calculated* weekly production all companies (Net tons)	Number of weeks in month
January	6,576,524	97.8	478,038	85.9	369,395	95.4	7,423,977	96.8	1,675,841	4.43
February	6,031,363	99.3	447,843	89.1	344,532	98.6	6,823,738	98.5	1,705,934	4.00
March	6,787,630	100.9	503,673	90.5	381,219	98.5	7,672,522	100.0	1,731,946	4.43
1st Quarter	19,395,517	99.3	1,429,574	88.4	1,095,146	97.5	21,920,237	98.4	1,704,529	12.86
April	6,510,563	99.9	481,810	89.4	382,532	102.1	7,374,905	99.3	1,719,092	4.29
May	6,669,436	99.1	483,024	86.8	398,057	102.9	7,550,517	98.4	1,704,406	4.43
June	6,202,640	95.2	453,599	84.1	384,645	102.6	7,040,884	94.8	1,641,232	4.29
2nd Quarter	19,382,639	98.1	1,418,433	86.7	1,165,234	102.5	21,966,306	97.5	1,688,417	13.01
1st 6 months	38,778,156	98.7	2,848,007	87.6	2,260,380	100.0	43,886,543	98.0	1,696,426	25.87
July	6,556,531	96.8	466,288	90.6	393,342	94.0	7,416,161	96.3	1,677,864	4.42
August	6,699,850	98.7	484,957	94.0	407,224	97.1	7,592,031	98.3	1,713,777	4.43
September	6,646,702	101.4	480,635	96.4	391,241	96.6	7,518,578	100.8	1,756,677	4.28
3rd Quarter	19,903,083	99.0	1,431,880	93.6	1,191,807	95.9	22,526,770	98.4	1,715,672	13.13
9 months	58,681,239	98.8	4,279,887	89.5	3,452,187	98.5	66,413,313	98.1	1,702,905	39.00
October	6,891,753	101.6	513,521	99.5	413,787	98.7	7,819,061	101.3	1,765,025	4.43
November	6,525,323	99.3	440,941	88.2	390,564	95.2	7,356,828	98.4	1,714,878	4.29

Note—The percentages of capacity operated are calculated on weekly capacities of 1,518,621 net tons open hearth, 125,681 net tons Bessemer and 87,360 net tons electric ingots and steel for castings, total 1,731,662 net tons; based on annual capacities as of January 1, 1943 as follows: Open hearth 79,180,880 net tons, Bessemer 6,553,000 net tons, electric 4,554,980 net tons. Beginning July 1, 1943, the percentages of capacity operated are calculated on weekly capacities of 1,531,789 net tons open hearth, 116, 494 net tons Bessemer and 94,667 net tons electric ingots and steel for castings, total 1,742,950 net tons: based on annual capacities as follows: Open hearth 79,867,450 net tons, Bessemer 6,074,000 net tons, Electric 4,935,960 net tons.

* Revised to include production of new facilities not previously reported

YEAR 1942

Period	Estimated Production—All Companies: Open Hearth Net tons	Open Hearth Percent of capacity	Bessemer Net tons	Bessemer Percent of capacity	Electric Net tons	Electric Percent of capacity	Total Net tons	Total Percent of capacity	Calculated weekly production all companies (Net tons)	Number of weeks in month
January	6,322,215	95.3	490,874	86.0	299,017	94.2	7,112,106	94.5	1,605,442	4.43
February	5,785,918	96.6	453,549	88.0	273,068	95.2	6,512,535	95.9	1,628,134	4.00
March	6,572,930	99.0	493,191	86.4	325,990	102.7	7,392,111	98.2	1,668,648	4.43
1st Quarter	18,681,063	97.0	1,437,614	86.7	898,075	97.4	21,016,752	96.2	1,634,273	12.86
April	6,345,133	98.7	454,834	82.2	321,324	104.5	7,121,291	97.7	1,659,975	4.29
May	6,595,440	99.4	453,938	79.5	333,200	104.9	7,382,578	98.1	1,666,496	4.43
June	6,239,674	97.1	452,528	81.3	323,100	105.1	7,015,302	96.3	1,635,269	4.29
2nd Quarter	19,180,247	98.4	1,361,300	81.2	977,624	104.8	21,519,171	97.4	1,654,049	13.01
1st 6 months	37,861,310	97.7	2,798,914	83.9	1,875,699	101.1	42,535,923	96.8	1,644,218	25.87
July	6,345,315	95.7	453,686	79.6	345,957	96.6	7,144,958	94.5	1,616,506	4.42
August	6,414,637	96.5	467,293	81.8	345,725	96.3	7,227,655	95.4	1,631,525	4.43
September	6,286,855	97.9	437,961	79.4	332,703	95.9	7,057,519	96.4	1,648,953	4.28
3rd Quarter	19,046,807	96.7	1,358,940	80.3	1,024,385	96.3	21,430,132	95.4	1,632,150	13.13
9 months	56,908,117	97.3	4,157,854	82.7	2,900,084	99.4	63,966,055	96.3	1,640,155	39.00
October	6,750,829	101.5	461,897	80.9	366,788	102.2	7,579,514	100.0	1,710,951	4.43
November	6,371,750	99.0	458,469	82.9	349,593	100.5	7,179,812	97.8	1,673,616	4.29
December	6,471,261	97.6	475,204	83.4	358,075	100.0	7,304,540	96.6	1,653,611	4.42
4th Quarter	19,593,840	99.4	1,395,570	82.4	1,074,456	100 9	22,063,866	98.2	1,679,127	13.14
2nd 6 months	38,640,647	98.0	2,754,510	81.3	2,098,841	98.6	43,493,998	96.8	1,655,853	26.27
Total	76,501,957	97.9	5,553,424	82.6	3,974,540	99.8	86,029,921	96.8	1,649,979	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,498,022 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons Bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, Bessemer 6,721,400 net tons, Electric 4,225,890 net tons.

average hours worked per week as well.

Under the new method of computation, steel companies report: (a) Number of employees receiving pay in a month; (b) the number of separations; (c) the number of additions; and, (d) the net number of employees, or the working force, which is arrived at by adding b and c, dividing this by two, and substracting the result from the number of employees receiving pay in that month.

It would have been impracticable and impossible to post correctly the actual portion of the month for which those leaving that month, or being added that month, had actually worked. In order to do this, it would have been necessary to make an individual study of all payrolls. The Iron and Steel Institute apparently decided to consider that all separations and additions to the monthly payroll were equivalent to a half month's work, regardless of the actual time paid for. It is for this reason that separations and additions are added together and divided by two. By subtracting this result from the total number of employees who received payment during the month, no matter how small or how large, a net figure has been obtained which is said to closely approximate actual conditions.

Under the method used before the revision was made, the number of employees used for each month by the industry was the total number of employees who received actual payment during the month. This, as pointed out in detail in THE IRON AGE May 13, page 102, resulted in the monthly employee figure being inflated to quite an extent.

Steel Payrolls Hit New Peak

• • • Steel industry payrolls again in October established a new record, amounting to a total of $144,937,000, according to the American Iron and Steel Institute. The previous peak was $143,769,000 during September which had one less working day and $126,627,000 in October a year ago. In October, 615,000 employees were on the industry's payrolls, compared with 620,000 in September. Wage-earning employees earned an average of $1.158 per hour in October, as against $1.16 per hour in September.

Restrictions Ordered Waived on Transfer of Fabricated Articles, Parts

Washington

• • • Action to move into regular distribution channels inventories of fabricated articles or components made idle by contract modifications or terminations has been taken by the WPB.

Under a delegation of authority signed by program vice-chairman J. A. Krug, each of the WPB regional directors has been authorized to waive restrictions which have limited transfers of such articles and components.

Approval will be granted by the regional directors for transfers of idle material reported to WPB. Sales may be made only to a distributor or wholesaler who certifies that he is regularly engaged in the business of selling the material in the form in which it is being acquired.

The authority covers materials other than "Industrial materials" as defined in Priorities Regulation No. 13. The items affected by the announcement, therefore, are fabricated articles or components rather than raw materials. Each regional director may act only with respect to material physically located within his region.

The transers permitted are also limited as follows: The material must have been listed—including an adequate description—with the regional office.

Material subject to the control of Directive 16 (pertaining to aircraft inventory transfers) is not covered by the delegation, until the sale has been approved by the Aircraft Resources Control Office or the Aircraft Scheduling Unit.

Material rejected by any of the services is not included.

It is not intended that the materials acquired by distributors as a result of such special transactions will be deducted in processing PD-1X applications for similar materials from normal sources of supply.

The restrictions which are waived by the action are contained in Priorities Regulation No. 1, which requires holders to use or dispose of materials obtained with priorities assistance on a preference rating of AA-5 or higher, or a rating equivalent to that originally used to acquire materials. Under these conditions, and particularly in view of changed contracts resulting from shifting war demands, holders of materials often have experienced great difficulty in finding allowable interested buyers.

The delegation of authority also waives restrictions imposed by other WPB orders such as Order L-63, which normally limit inventories, so as to permit distributors and wholesalers to accept material purchased under the program.

It was explained that Priorities Regulation No. 1 already provides for the re-delivery of materials to the persons from whom they were obtained.

This program, initiated by Col. C. R. Baxter, director of the WPB Redistribution Division, has been approved by the WPB Operations Council.

•

Aircraft Scheduling Unit Authorized to Schedule Contractor's Equipment

Dayton, Ohio

• • • The institution of procedures whereby Aircraft Scheduling Unit is empowered to schedule critical CFE components under WPB General Scheduling Order M-360, has been announced by Col. E. W. Rawlings, administrator of the ASU at Wright Field.

Col. Rawlings emphasized his belief that the cooperation existing between manufacturers and ASU will make it unnecessary to resort to scheduling except in isolated and infrequent cases —such cases as revision in spares requirements and changed programs resulting from actual combat experience demand. Industry advisory committee cooperation and continually increasing "know how" were other factors cited as likely to avert the need for widespread scheduling.

Component scheduling will be undertaken only after it has definitely been determined that utilization of surplus stocks, deflation of order boards, increased production through industry advisory committee procedure and remedial action have failed to bring requirements in line with productive capacity.

When scheduling is inevitable, the ASU will give advance notice, stating the component to be scheduled and listing the contract involved. Scheduling activity will cease when causes of the shortage have been eliminated and delivery schedules restored to balance with end use.

Small Allocations to Be Made Locally

Washington

• • • **Field officers of WPB** may now allocate controlled materials to small users, according to the new program of decentralization. This will apply to all users who do not consume more than the following amounts in any quarter:

Carbon steel, 150 tons; alloy steel, 40 tons; copper base alloy sheet and strip, 8000 lb.; copper base alloy rod, bar, and wire, 10,000 lb.; copper base alloy tubing and pipe, 5000 lb.; brass mill copper products, 10,000 lb.; wire mill copper products, 15,000 lb.; copper and copper base alloy foundry products, 30,000 lb.; aluminum—all shapes, 7000 lb.

Allocations for these small users are subject to review in any quarter, however, and in case of necessity additional amounts will be allocated upon a showing. The field officers are also permitted to grant such interim allotments under limitations laid down in Internal Operating Instruction No. 14 (rev.), Supl. 3, which reads:

FPI-18, General 2, which is the instruction to Field Office for processing interims, states that when interim requests involve quantities beyond certain limits for any one quarter, the Field Office may request the appropriate Industry Division to supply the materials necessary to make the allotment, or to return the case to Washington.

The stated quantity limits are:

Material	Code No.	Quantity
Steel	2001–2061	50 tons
Carbon steel	2501–2561	10 tons
Copper-Base Alloy		
Plate, sheet and strip	3011	4000 lb.
Rods, bars and wire, including extruded shapes	3021	3000 lb.
Tubing and pipe	3041	1500 lb.
Copper		
Plate, sheet and strip	3051	3000 lb.
Rods, bars and wire, including extruded shapes	3061	3000 lb.
Tube and pipe	3071	3000 lb.
Copper and Copper-Base Alloy Wire Mill Products		
Wire and cable	3101	5000 lb.
Copper and Copper-Base Alloy Foundry Products		
Castings — and pressed metal shapes made of powder	3201	10,000 lb.
Aluminum		
All shapes—total	4021 to 4411 Inc.	2000 lb.

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Small Processing Installations Permitted

Washington

• • • **Action to facilitate** the installation of processing machinery or equipment, or the relocation of any machinery or equipment within certain plants, if the cost of the installation materials is less than $500, was taken on Thursday of last week by WPB, in Direction 2 to Order L-41 and Direction 15 to CMP Regulation 5.

Permission to install processing machinery or equipment or to relocate all kinds of machinery or equipment is limited to factories, plants and other industrial units having a productive floor area of 10,000 sq. ft. or more which do not make products listed on Schedule A of L-41.

Under Direction 15 to CMP Regulation 5, MRO ratings and allotments may be used by persons on Schedules 1 and 2 of the regulation to get the installation materials required for these jobs. The amount spent in construction permitted by Direction 2 is not limited to and need not be deducted from the amount allowed for construction under paragraph c of L-41.

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Price Briefs

• Amdt. 2 to MPR 188 establishes ceiling prices for four types of bedsprings.

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• Amdt. 3 to MPR 413 establishes a 5 per cent upward adjustment of maximum prices for sales of hinges and butt hinges by manufacturers and resales by jobbers. Retail prices remain unchanged. (Release No. OPA-T-1496)

•

• Order 119 under MPR 136 permits a higher ceiling price on the sales of second-hand construction or road-building equipment to the Treasury Procurement Division and the War Department for use in the United Kingdom.

•

• Amdt. 13 to RPS 4 rules that scrap dealers no longer will be required to absorb inbound rail transportation charges on heavy breakable cast scrap which has been allocated or which they have purchased in behalf of a foundry consumer. (Release No. OPA-T-1525)

CMP Developments

• Reg. 9A grants supplies of copper, steel and aluminum to repairmen who have been certified as eligible. (Release No. CMPL-529)

•

• Dir. 39 to Reg. 1 gives notice that the Official CMP Product List contained in the monthly publication known as Products and Priorities will hereafter be the only authorized list of Class B products and Class A civilian type products.

Priority Changes

L-22—Amended order permits carbon steel inner liners for new furnaces installed to heat new buildings or additions to old buildings. (12-9-43)

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L-30-d—Amended order permits manufacturers of household baking pans, vacuum bottles, and garment hangers to avail themselves of certain kinds of metal in addition to the kinds they have been using, but over-all quota restrictions on materials remain unchanged. (12-9-43)

•

L-38—Amended order permits manufacturers of mechanical water coolers to produce these units for industrial uses. (12-6-43)

•

L-41—Dir. 2 limits permission to install processing machinery or equipment in factories, plants and other industrial units having a productive floor area of 10,000 sq. ft. or more which does not make products listed on Sched. A of the order. (12-9-43)

•

L-42—Sched. III, as amended, prohibits use of fusible plugs, tri-cocks and metal jackets (except for gas fire burner-boiler units necessary as a functional part of the boiler) for low-pressure heating boilers fired by solid, or gas fuel. (12-6-43)

•

L-78—Amended order rules that new fluorescent lighting fixtures may be bought under blanket MRO ratings, including ratings extended under CMP Reg. 5 only if purchase orders carry ratings of AA-1 or AA-2. (12-9-43)

•

L-157—Sched. V, as amended, limits the amount of garden rakes manufacturers may produce in 1944 to 60 per cent by weight of the volume of garden rakes produced in 1940 or 1941, whichever is greater. (12-8-43)

•

L-185—Amended order makes several minor changes to bring definitions of the order in line with other WPB orders. (12-8-43)

•

L-215—Amended order lifts all restrictions on the sale and rental of used textile, clothing and allied machinery. (12-10-43)

•

L-257-a—Amended order increases slightly the total permitted tonnage of farm machinery for export to Canada during the current year. (12-9-43)

•

L-272—Sched. 1, as amended, exempts flow diversion valves manufactured for use in the pasteurization of milk from the restrictions of the schedule. (12-8-43)

•

L-292—Int. 1 eliminates any confusion that may result from certain provisions that relate to the term "approved orders" for food processing machinery. (12-6-43)

•

M-81—Dir. 1 authorizes the substitution of tinplate waste-waste for frozen tinplate in cases where frozen tinplate is specified as a can material for packing a product under the order. (12-11-43)

•

M-353—Corrected order voids preference ratings below AA-2 for pure titanium dioxide except on military orders. (12-6-43)

•

P-142—Dir. 1 rules that railroads can obtain malleable iron hand-brake wheels for freight cars only for maintenance and repair of their rolling stock. (12-11-43)

•

Dir. 9 to Reg. 1 provides that rules, regulations, or orders of WPB apply to deliveries and use of materials in the territories and possessions of the United States after their effective dates unless the order or regulation specifically states that it is limited to the continental United States or to the 48 states and the District of Columbia. (12-6-43)

•

Dir. 4 of Reg. 3 broadens procedures under which employees may use their employers' MRO preference rating if they are higher than AA-3 to purchase hand tools and safety equipment. (12-7-43)

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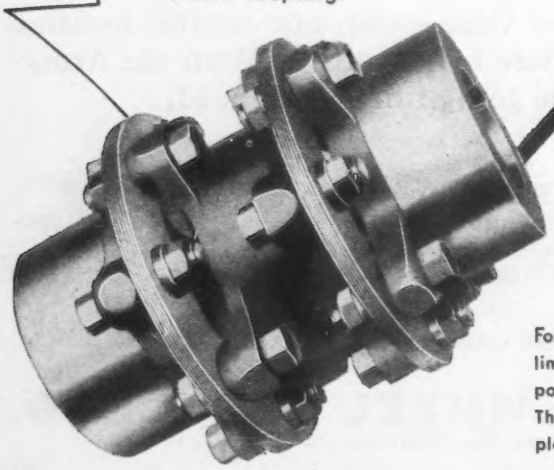

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7th List of Seized Patents, Valuable In Post-War Planning

• • • Here is the seventh consecutive list of seized patents available to firms which obtain a license from the Alien Property Custodian. The current series started in the issue of Nov. 4, page 95, at which time complete, up-to-date information was published about the rules and procedures. Seized patent applications were listed July 8, also in the news section of this magazine.

In the items below, the sub-class number appears first, followed by the patent number, description, inventor's name and nation, and the date the patent was issued. The patent description in full may be obtained as outlined in the Nov. 4 issue.

Class 77—Boring and Drilling

(1) 1,636,475. Machine for drilling precious stones, particularly diamond drawing dies, comprising a rotating drill holder, and alined work holder and means for continuously reciprocating the work holder. S. Loewenherz, Germany. 7-19-27.

(3) 2,170,054. Apparatus for boring crankcase bearings, more particularly of automobile engines and aeroplane motors, both in production and in repairing work. P. Jeschor, Germany. 8-22-39.

(3) 2,219,232. Auxiliary power device for transmitting motions of a machine part to another one, preferably in profiling attachments of machine tools, such as fine boring mills. J. Lindig, Germany. 10-22-40.

(3) 2,268,214. Boring machine and more particularly a machine of the type in which the frame is constituted by a horizontal beam on which a tool support and holders for supporting the work piece and the boring tool are slidably guided. J. Irtenkauf, Germany. 12-30-41.

(4) 1,899,124. Vertical boring and turning machine in which the work rotates and in which the boring head slides upon a non-rotatable boring rod. H. Vogler, Germany. 2-28-33.

(4) 1,981,682. Device for protecting the stationary boring rod of vertical lathes in which the work rotates upon a table and the boring rod carries an axially movable boring head. H. Vogler, Germany. 11-20-34.

(4) 2,042,720. Jig boring machine having a fixed bed, a work holder on said bed, an annular support on the bed and extending over and completely encircling the work holder. H. Lindner, Germany. 6-2-36.

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(4) 2,086,284. Precision boring machine having one or more spindles which is intended more particularly for producing accurate bored holes, such as for example, are required in the case of internal combustion engines or the like. C. Pieger, Austria. 7-6-37.

(5) 1,801,881. Drilling machine wherein the drilling spindle is arranged centrally between two columns connected at their lower ends by a foot plate and at their upper ends by a box-like head bridge. W. Schubbe, Germany. 4-21-31.

(5) 1,951,935. Process for sintering fine ores or the like in which combustion is effected by supply of air and practically pure iron sponge is employed at least as a substantial part of the fuel. F. Johannsen, Germany. 3-20-34.

(5) 1,991,285. Machine tool for machining articles by means of a rotary tool comprising a special construction of the housing employed for receiving and guiding the tool spindle carrier. H. Lindner, Germany. 2-12-35.

(5) 2,075,856. Drilling tool with optical means whereby the work may be inspected from time to time during the drilling operation without removing the tool from the work. E. Leitz, Jr., Germany. 4-6-37.

(5) 2,146,906. Device for adjusting a rotatably and tiltably mounted table with respect to the axis of a drilling spindle. G. Moller, Germany. 2-14-39.

(5) 2,166,101. Centering means for drilling

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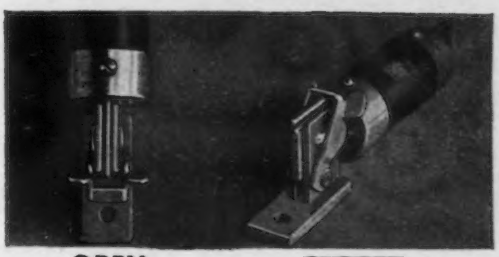

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machine spindles. G. Moller, Germany. 7-11-38.

(5) 2,204,811. Centering means for drilling machine spindles. G. Moller, Germany. 6-18-40.

(25) 2,204,485. Machine tool having a rotary tool carrier head in which tool spindles are arranged radially to the axis thereof. F. Gaitzsch, Germany. 6-11-40.

(28) 2,310,870. Radial drilling machine wherein the drill spindle of both the column and rotary jacket types, may practically occupy any desired position. V. Retterath, Germany. 2-9-43.

(32) 2,301,977. Drilling or boring tool having an automatic feed movement and a quick return movement. W. Schwenecke, Germany. 11-17-42.

(36) 2,118,387. Drilling spindle drive for vertical drilling machines of the type having a drill head adjustable in the direction of the axis of the drilling spindle and in which a belt pulley partakes in the motion of and is fixed on the drilling spindle. G. Wolfle, Germany. 5-24-38.

(55) 1,634,716. Drill socket provided with a clutch device subjected to the pressure of a spring and adapted to be thrown into, and out of, operative position. W. Kasmaier, Germany. 7-5-27.

(55) 1,711,427. Releasible drill holder for drilling machines having an automatic feed comprising a drill holder consisting of two parts. H. Sauveur, Germany. 4-30-29.

(55) 2,192,528. Depth stop for a countersinking or boring tool. C. Schmidt, Germany. 3-5-40.

(55) 2,193,764. Device for producing grooves in the walls of bores with the aid of a rotating tool which is mounted in a holder adapted to the diameter of the bore. K. Joos, Germany. 3-12-40.

(56) 2,040,225. Chuck comprising a driving member and a two-part boring rod wherein one of the two-part boring rod is provided with an annular projection and the other part with a correspondingly shaped groove. F. Walther, Germany. 5-12-36.

(56) 2,108,699. Boring bar for operation between two centers. F. Walther, Germany. 2-15-38.

(61) 1,992,346. Tool for drilling polygonal holes in which two camming members are arranged co-axially in a casing in spaced-apart relation for guiding the drill. R. Bartholomaus, Germany. 2-26-35.

(61) 2,263,788. Machine for generating multisided apertures. H. Schroeder, Germany. 11-25-41.

(61) 2,305,812. Boring machine or drill capable of working upon the bottom surfaces as well as the side surfaces of bores in work pieces. P. Regul, Germany. 12-22-42.

(63) 2,080,643. Multiple spindle boring machine comprising a frame and a boring spindle mounted thereon stationary in the axial direction of the spindle. F. Walther, Germany. 5-18-37.

(63) 2,110,958. Drilling machine of the type having a bed, a sub-table and a table and wherein the sub-table is guided on the bed to move in a rectilinear path. H. Lindner, Germany. 3-15-38.

(64) 1,621,145. Feeding device for grinding

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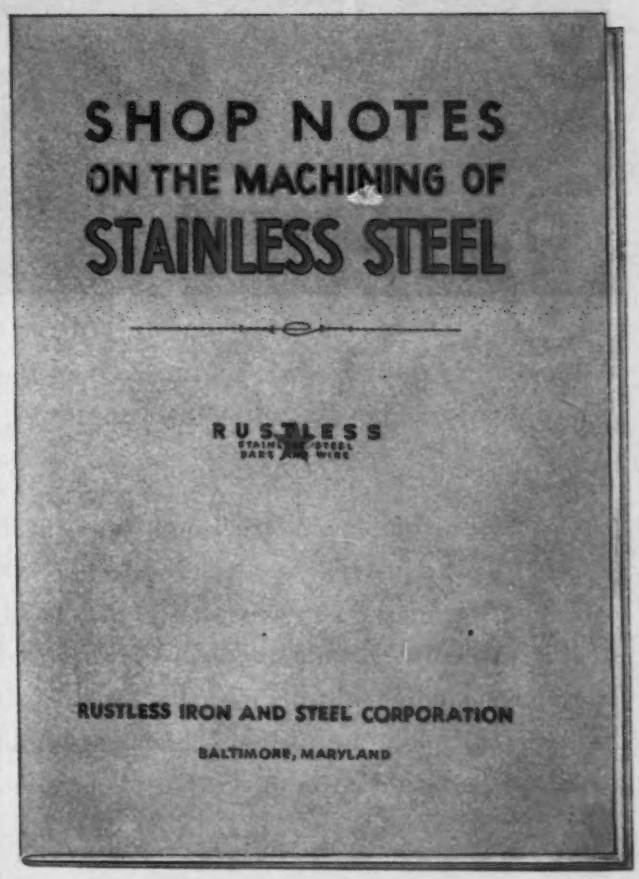

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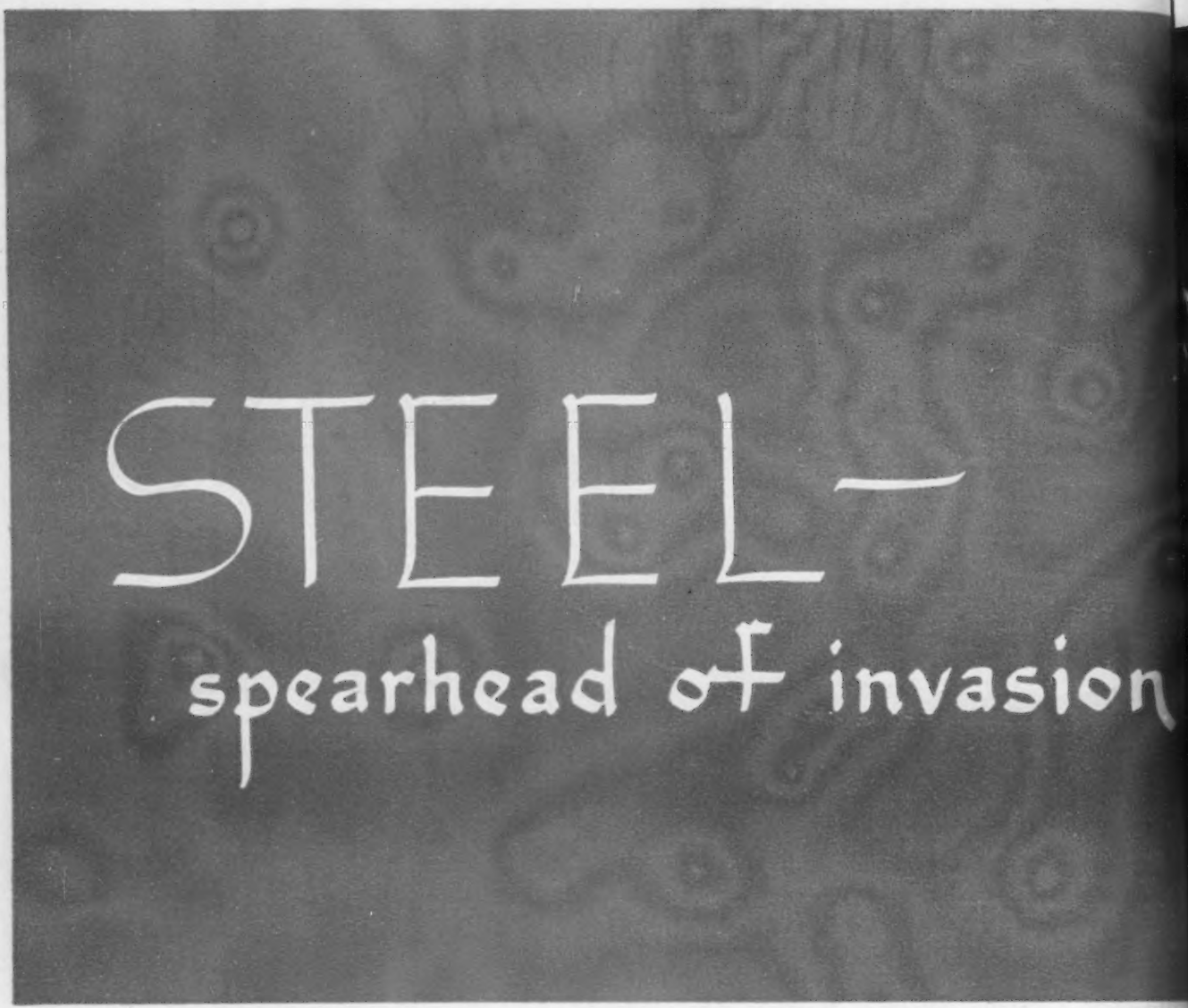

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milling, or boring machines and the like. C. Weber, Germany. 4-15-27.

(71) **2,301,981.** Bore tool holder for bore machines used for precision work wherein the entire conical surface of the spindle is in contact with the corresponding surface of the mandrel. K. Steffens, Germany. 11-17-42.

(5) **2,283,338.** Drilling machine comprising a tool supporting carriage, an arm of fixed position, means for guiding said carriage parallel to said arm and a support for the piece of work adapted to be secured in fixed position with respect to said arm. M. Pegard, France. 5-19-42.

(27) **2,288,420.** Carriage control means of machine tools. M. Pegard, France. 6-30-42.

(27) **2,290,766.** Machine tool, and especially radial drilling machine having a drill carrying carriage adapted to move along a radial arm, pivotally mounted about a cylindrical column. M. Pegard, France. 7-21-42.

(58) **1,777,265.** Self-centering cutter head for precision boring machines. H. Jacobsen, Denmark. 9-30-30.

Class 80—Metal Rolling

(1) **1,864,090.** Drive mechanism for the rolls of rolling mills whereby the top rolls of sheet-rolling mills may be driven at will either rigidly or yieldingly. P. Muller, Germany. 6-21-32.

(5) **1,904,734.** Machine for rolling rings having a bearing ring with a radial fibrous structure made from a tubular blank. F. im Schlaa, Germany. 4-18-33.

(5) **1,986,072.** Device for the manufacture of shaped pieces from annular blanks. F. im Schlaa, Germany. 1-1-35.

(5) **2,049,202.** Ring rolling mill of the type which comprises a rotary main or profile roll and a rotary rolling table carrying a plurality of individual, loosely mounted pressure rolls which, during rotation of the table, are adapted to cooperate alternately or successively with the said main or profile roll. H. Edelmeier, Germany. 7-28-36.

(6) **2,257,253.** Screw threading machine of the type comprising a pair of externally screw threaded roller dies placed one beside the other and adapted to be rotated in the same direction for rolling a screw thread into a blank placed between the same. W. Wemhoner and W. Plagemann, Germany. 9-30-41.

(9) **1,940,367.** Method for the production of threads in screw-thread rolling cheeks. K. Nagel, Germany. 12-19-33.

(11) **1,764,598.** Rolling mill comprising one set or a plurality of sets of rolls located in the direction of the movement of the blank one behind the other. G. Asbeck, Germany. 6-17-30.

(11) **1,815,867.** Rolling mill and process for rolling tubes especially tubes of the smaller diameters. J. Roeder and W. Wellmann, Germany. 7-21-31.

(11) **2,041,271.** Rolling mill for reducing tubes to a smaller diameter. H. Stuting, Germany. 5-19-36.

(11) **2,170,513.** Method of reducing tubes by rolls and to reducing rolls. G. Asbeck, Germany. 8-22-39.

(11) **2,204,491.** Rolling mill plant for the manufacture of seamless tubes. H. Heetkamp, Germany. 6-11-40.

(11) **2,214,279.** Continuously running rolling mill for producing tubes. F. Kocks, Germany. 9-10-40.

(12) **2,207,245.** Process for manufacturing weldless metal tubes with relatively thin walls, for instance of the type commonly used for pipes for conveying fluids by stretching a hollow ingot or blank with relatively thick walls and closed or open bottom. E. Dvorak, Italy. 7-9-40.

(12) **2,234,182.** Slant rolling process and apparatus for rolling out profiled pieces of hollow bodies which have been produced in a tube rolling, pressing, drawing or other operation. A. Lauer, Germany. 3-11-41.

(13) **1,682,724.** Apparatus for expanding metal tubes with regular or varying thickness of wall. R. Bungeroth, Germany. 8-28-28.

(13) **1,714,084.** Rolling mill for manufacturing seamless pipes. J. Gassen, Germany. 5-21-29.

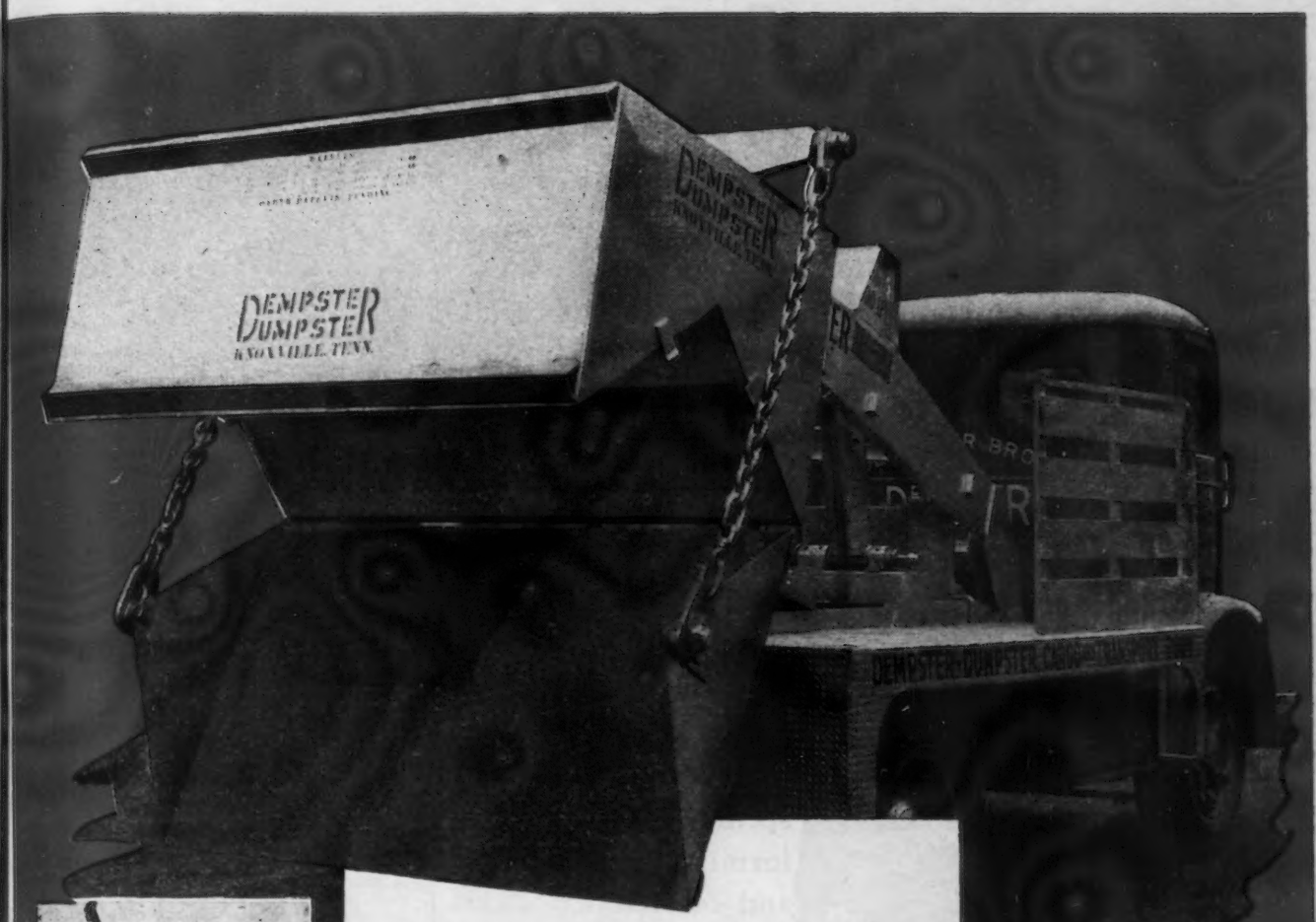
(13) **1,732,404.** Apparatus for cooling the mandrels of tube-rolling mills. H. Idel, Germany. 10-22-29.

(13) **1,753,767.** Rolling mill for manufacturing seamless pipe and other tubular products. G. Asbeck, Germany. 4-8-30.

(13) **1,771,420.** Method of rolling tubes from hollow blocks. M. Roeckner, Germany. 7-29-30.

(13) **1,778,111.** Process of and apparatus for expanding blanks by rolling more particularly by means of inclined rollers. F. Kocks, Germany. 10-14-30.

(13) **1,784,791.** Rolling mill for enlarging



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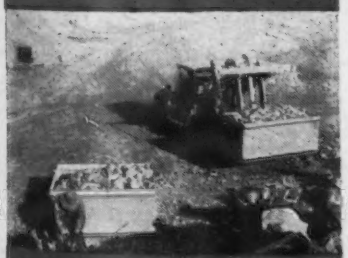
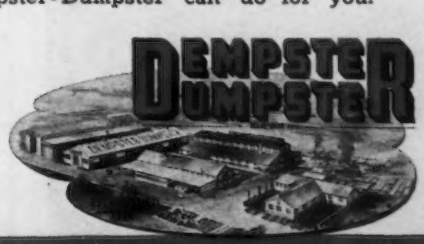
These illustrations will, no doubt, suggest other uses for the Dempster-Dumpster in your plant. Write for fully illustrated catalog No. 242, showing what the Dempster-Dumpster can do for you.





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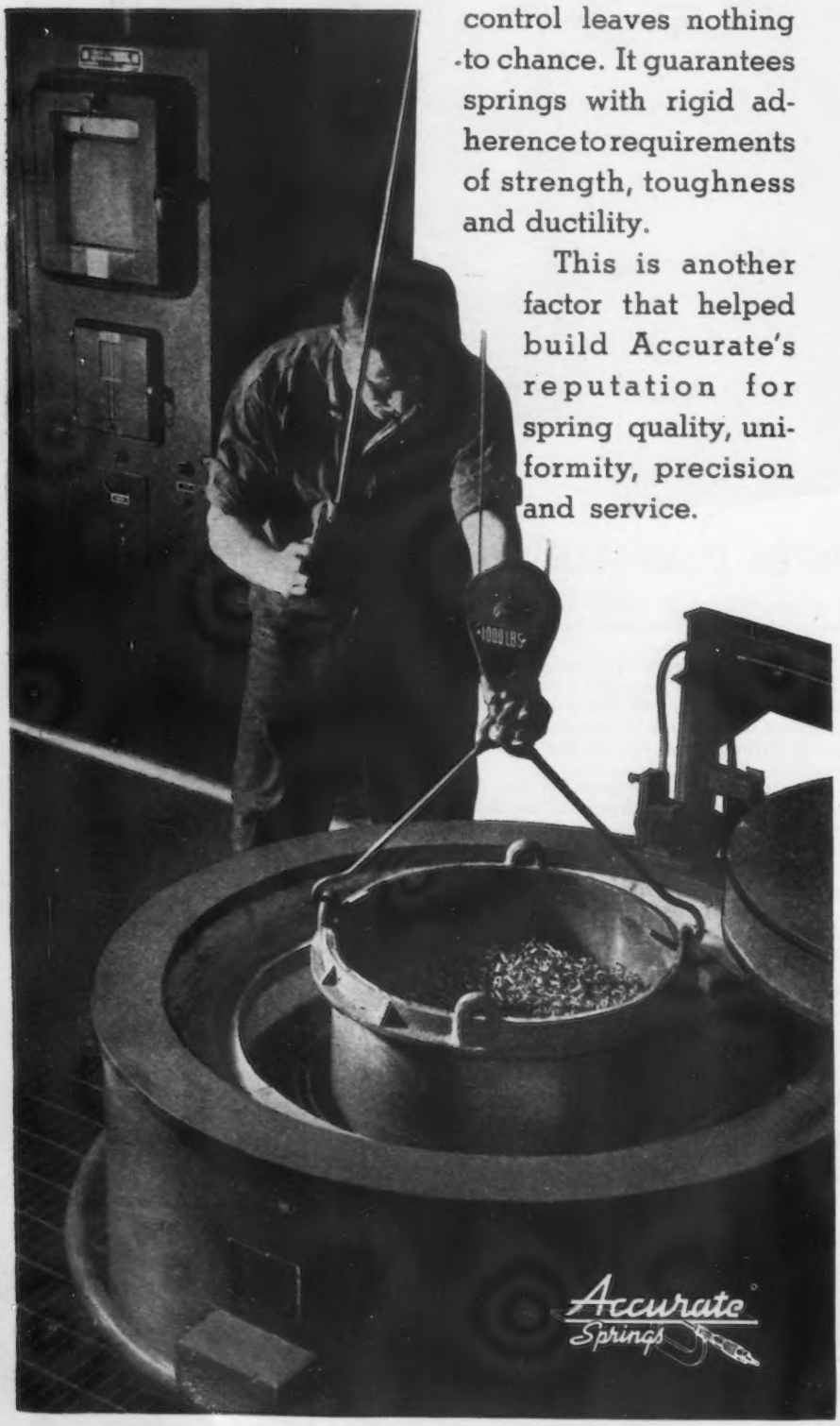

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and smoothing tubes by rolling the same over a mandrel. K. Gruber, Germany. 12-9-30.

(13) 1,808,631. Apparatus for expanding metal tubes with regular or varying thickness of wall. R. Bungeroth, Germany. 6-2-31.

(13) 1,868,227. Mechanism for driving inclined rolls from the pinions of rolling mills. H. Esser, Germany. 7-19-32.

(13) 1,897,770. Apparatus for rolling seamless tubes. J. Severin, Germany. 2-14-33.

(13) 1,936,019. Apparatus for rolling seamless hollow bodies. P. Horbach and K. Simonett, Germany. 11-21-33.

(13) 1,990,607. Rolling mill having inclined rolls for rolling solid or hollow blanks. F. Kocks, Germany. 2-12-35.

(13) 2,040,612. Rolling mill with inclined rolls. F. Kocks, Germany. 5-21-36.

(13) 2,093,244. Mill for rolling thin-walled seamless tubes by stretching tubular blanks between inclined rolls. F. Kocks, Germany. 9-14-37.

(13) 2,198,540. Production of metal tubes in inclined rolling mills by the elongation of hollow metal bodies. F. Kocks and J. Mehren, Germany. 4-23-40.

(13) 2,224,487. Tube rolling mill for producing seamless tubes. M. Roeckner and J. Severin, Germany. 12-10-40.

(14) 1,670,256. Work piece shifting device for use in connection with reciprocating or oscillating rolling mills. K. Gruber and A. Stappen, Germany. 5-15-28.

(14) 1,724,314. Rolling mill of the pilger type. E. Rober, Germany. 8-13-29.

(14) 1,744,731. Driving gear for the feeding mechanism of pilgering mills. O. Bamberger, Germany. 1-28-30.

(14) 1,876,691. Pilger rolling process and roll for performing same. L. Klein, Germany. 9-13-32.

(14) 1,917,448. Pilgering rolling mill. F. Kocks, Germany. 7-11-33.

(14) 1,936,475. Feeding device for pilger rolling mils. H. Fritsch, Germany. 11-21-33.

(14) 1,960,178. Pilger rolling mill for the production of seamless tubes wherein each tube is rotated between successive steps in a rolling operation through a predetermined angle so that thickened portions produced in the tube wall in one step are rolled out in the next. W. Albert, Germany. 5-22-34.

(14) 1,982,472. Revolving device for pilger mills in which the blank is rotated in known manner while being moved forward by means of a twist bar operating in a twist casing. H. Heetkamp, Germany. 11-27-34.

(14) 2,005,657. Process and apparatus for the production of tubes upon a pilger rolling mill. R. Ludwig, Germany. 6-18-35.

(14) 2,090,535. Process and apparatus for the production of seamless tubes in which pilger rolls are employed. W. Knoll, Germany. 8-17-37.

(16) 1,986,485. Mill for rolling revolution bodies from disk-shaped blanks or blocks in which a platen for supporting the blank cooperates with a pair of opposed blank-working rolls, and the rolls are traversed and retraversed over the platen. C. Schmidt, Germany. 1-1-35.

(18) 1,674,112. Device for the manufacture of metal balls. F. Hering, Germany. 6-19-23.

(19) 1,967,787. Apparatus for rolling sections having transverse ribs. H. Seiferth, Germany. 7-24-34.

(19) 1,967,788. Apparatus for producing profile metal articles. H. Seiferth, Germany. 7-24-34.

(19) 1,990,140. Method and apparatus for producing metal bars with transverse ribs. H. Seiferth, Germany. 2-5-35.

(22) 1,896,426. Machine for manufacturing hollow rotary elements from circular blanks of sheet metal. C. Schmidt, Germany. 2-7-33.

(24) 1,900,630. Rolling mill having a propeller of metal or other deformable material with a hub of sufficient dimensions for the transmission of the forces and for immediate mounting on the shaft, and with blades having thick profiles near said hub and flat profiles on their main length. J. Zagorski, Germany. 3-7-33.

(32)1,792,458. Rolling mill and method of rolling, particularly for the rolling of metal blanks of the character of sheets, bands or strips. E. Barten, Germany. 2-10-31.

(32) 1,957,009. Process of rolling metallic strips and sheets of thin sections of any desired length. L. Broemel, Germany. 5-1-34.

(34) 1,788,693. Roll bearings in universal rolling mills. H. Stuting, Germany. 1-13-31.

(34) 1,846,175. Rolling mill of the type in which a plurality of rolls disposed radially of the blank being rolled are driven by means of a common gear wheel disposed concentrically of the blank being rolled. G. Asbeck, Germany. 2-23-32.

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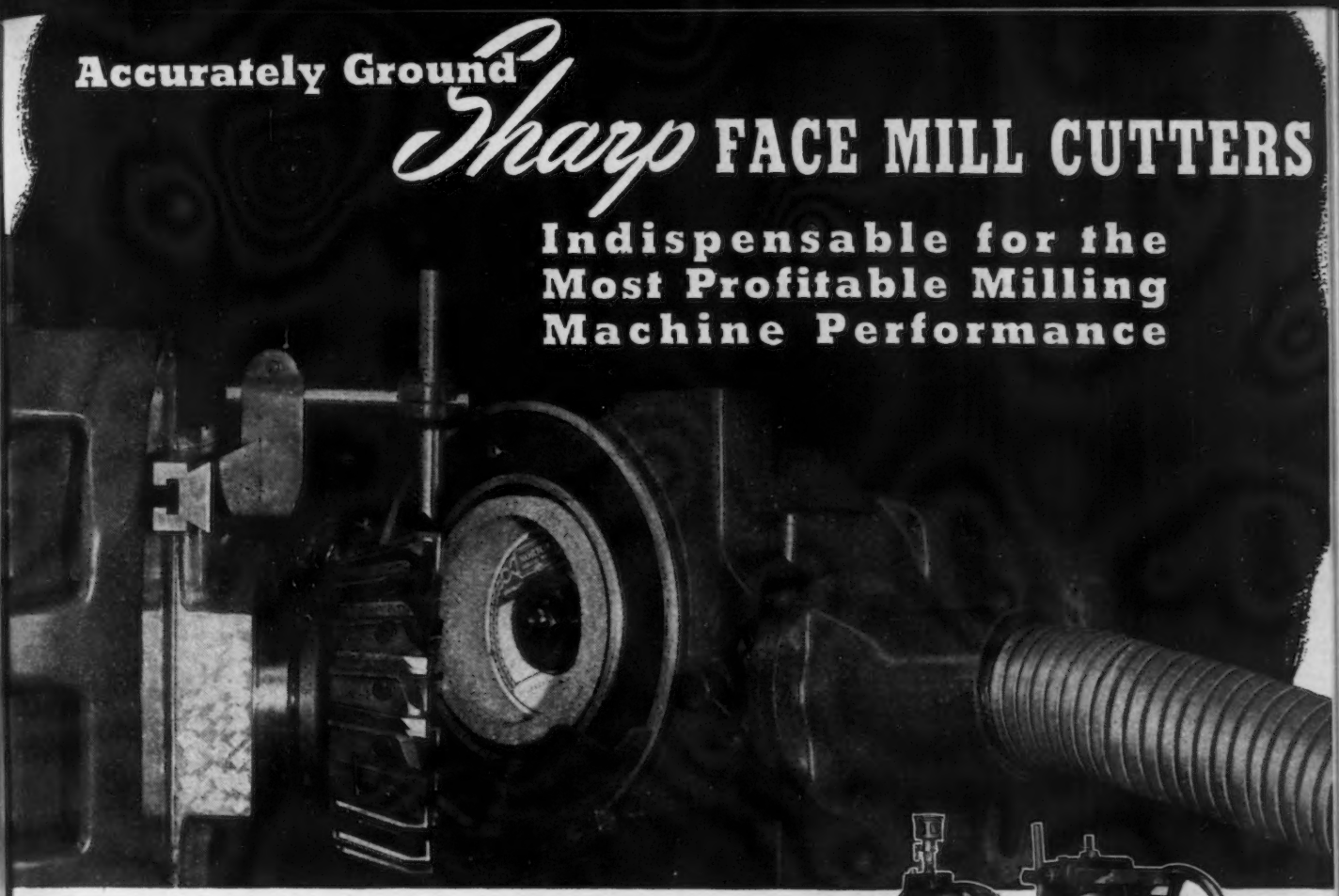

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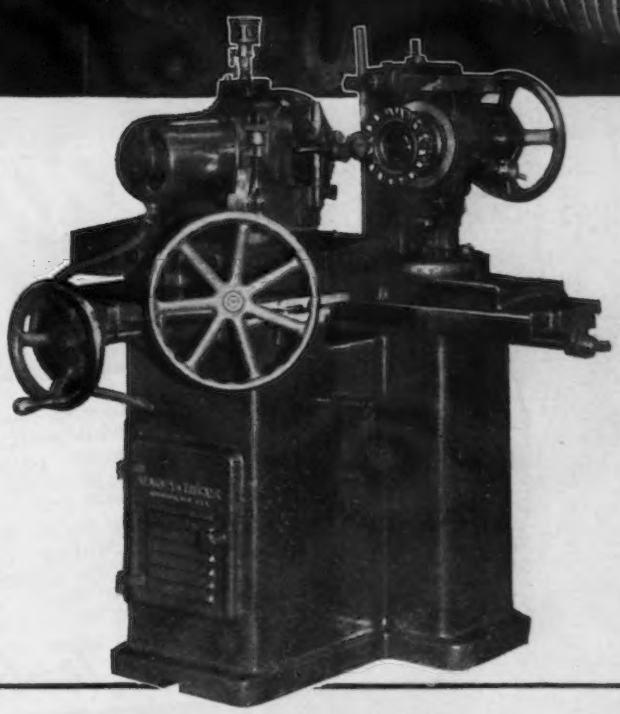

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- High speed performance reduces sharpening time
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(34) 2,053,694. Universal rolling mill which is equipped with means for actuating the individual rolls of the mill together. W. Buchels and R. Koppel, Germany. 9-8-36.

(34) 2,071,712. Roll stand unit for a continuous reducing mill. H. Stuting, Germany. 2-23-37.

(34) 2,120,539. Rolling mill adapted for reducing tubes in a number of roll passes disposed one behind the other and comprising a number of groups of working rolls, each group consisting of at least three rolls. P. Barth, Germany. 6-14-38.

(35) 2,121,929. Rolling mill with roll stands arranged in series for the continuous hot rolling of strip iron or broad band iron having a breadth greater than 600 mm. H. Puppe, Germany. 6-28-38.

(36) 1,858,788. Rolling mill of the tube reduction type in which the individual mills are arranged in alignment but the shafts of each individual mill are inclined at an angle of 90 deg. to those of the following or preceding individual mill. W. Rohn, Germany. 5-17-32.

(36) 1,878,595. Rolling mill of the type in which there is employed a plurality of rolls arranged in sets, the rolls of one set being parallel to each other, but at a right angle to those of the other set. F. Moller, Germany. 9-20-32.

(38) 1,903,724. Multi-high rolling mechanism. W. Rohn, Germany. 4-11-33.

(40) 2,184,030. Machine for rolling the bases of cartridge cases. A. Wolff, Germany. 12-19-39.

(41) 1,783,524. Method of heating rolls by magnetic hysteresis and eddying currents. W. Schotteldreier, Germany. 12-2-30.

(41) 2,150,340. Means for cooling so-called multi-high rolling mill. W. Rohn, Germany. 3-14-39.

(42) 1,689,552. Mechanically operated hot beds for iron rolling mills upon which the hot metal bars, rails, etc., are deposited as they come from the rolling mill and from which the bars are laterally transferred to the cooling bed proper. E. Kastel, Germany. 10-30-28.

(42) 1,718,870. Cooling bed for rolled metal bars. A. Noell, Germany. 6-25-29.

(43) 1,955,072. Device for introducing superposed plates of different metals. F. Jordan, Germany. 4-17-34.

(44) 1,783,555. Tube-transporting device adapted to remove the completed tube from a pilgrim mill and to transport it to the sawing devices. O. Bamberger, Germany. 12-2-30.

(47) 1,618,954. Rolling mill appliance comprising an apparatus of the kind used for lifting rolled bars and sheets from the position which they come through the rolls. G. Boscarelli, Italy. 2-22-27.

(49) 1,791,962. Apparatus for turning over the work in roll trains. H. Holtus, Germany. 2-10-31.

(54) 2,019,081. Universal rolling mill. R. Koppel, Germany. 10-29-35.

(54) 2,036,101. Continuous rolling mill. W. Rohn, Germany. 3-31-36.

(54) 2,240,362. Rolling mill stands intended for large output comprising a housing with two rolls vertically arranged therein, a horizontal drive shaft and a vertical shaft. K. Backhaus, Germany. 4-29-41.

(55) 2,150,248. Rolling mill of the type having a set of roll driving gear wheels or pinions and one or more sets of working rolls which are arranged side by side and interconnected by coupling spindles and couplings. K. Rosenbaum, Germany. 3-14-39.

(55) 2,200,837. Rolling mill for the purpose of cooling and lubricating the bearings and necks of rolling mill rolls and like bearings specially designed for heavy loads and high duty work. W. Fass, Germany. 5-14-40.

(55) 2,205,049. Bearing for supporting shafts and axles of various types and is particularly well suited for coaction with the roll necks of the working rolls of rolling mills. W. Rohn, Germany. 6-18-40.

(55) 2,211,386. Multiple rolling mill of the type having sets of working rolls spaced from each other in the rolling direction, a plurality of self contained individual rolling mills assembled side by side. K. Rosenbaum, Germany. 8-18-40.

(56) 1,697,012. Rolling mill for rolling bands of iron or other metals. R. Kronenberg, Germany. 1-1-29.

(56) 1,734,793. Bearing-adjusting means for roller mills. A. Bruninghaus, Germany. 11-5-29.

(56) 1,760,757. Pilgering rolling mill employing a stop which can be set at various positions vertically, and upon which the crosshead carrying the bearing for the upper roll comes to rest as it falls. H. Idel, Germany. 5-27-30.

(56) 1,811,586. Rolling mill, comprising rollers, in combination with one of the rollers,

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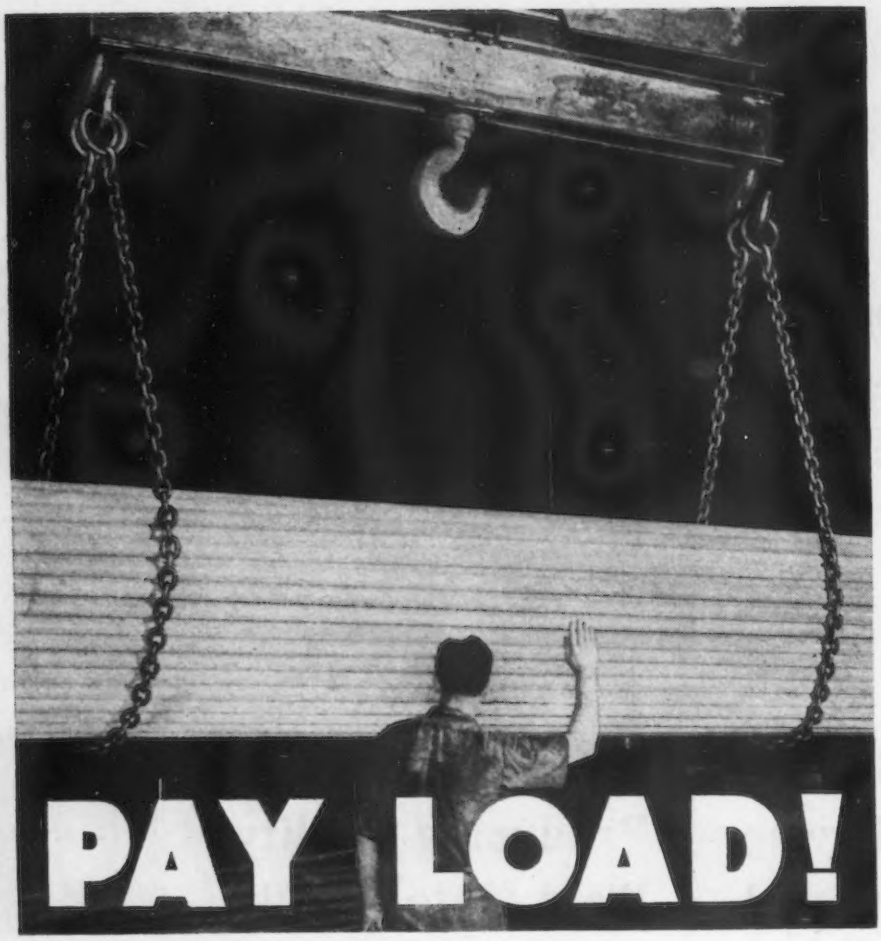

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an adjusting member provided for it and located above, and being coupled with it, a projection extending forth from the middle portion of said member. R. Kronenberg, Germany. 6-23-31.

(56) 1,882,507. Constructional form of rolling mill for adjusting the circularly curved supporting body for the bearing places of the roller. R. Kronenberg, Germany. 10-11-32.

(56) 2,040,755. Regulating means for rolling mechanisms. E. Meyer, Germany. 5-21-36.

(57) 2,108,746. Safety device for machine parts subject to high pressure. A. Erichsen, Germany. 2-15-38.

(58) 1,784,304. Electrically-operated edge-driven roll. F. Moller, Germany. 12-9-30.

(58) 1,851,848. Rolling mill roll having deep grooves for the passes of a rolling mill and provided at points of heat accumulation between the passes in the roll with well rounded recesses exceeding both the depth of said deep grooves and the depth normally provided for laterally closing said passes. W. Kohler, Germany. 3-29-32.

(58) 2,129,683. Manufacturing compound rolls having a martensitic white sleeve structure and a softer core, comprising a core of cast iron alloy, the elements of which produce a casting which has a graphitic structure which contains martensitic mixed crystals in an amount substantially corresponding to that in the sleeve structure. H. Gontermann and F. Kuhn, Germany. 9-13-38.

(58) 2,215,424. Rolls and process for making same, which may be used in rolling mills for reducing metal bars to thin sheets or strips. F. Klein, Germany. 9-17-40.

(60) 1,742,111. Process for the production of soft iron for the mass production of screws, nuts and the like and more particularly it refers to a method of forming the pile of puddle bars which is to be heated and rolled into stock of finished iron suitable for receiving machining operations. B. Weishan, Germany. 12-31-29.

(60) 1,795,379. Method of making flanged cup-shaped metal parts so that the parts are obtained without any auxiliaries such as mandrels, supporting rollers, etc. C. Schmidt, Germany. 3-10-31.

(60) 1,845,155. Process for raising the resistance of zinc to tearing during rolling. F. Jordan, Germany. 2-16-32.

(60) 1,946,240. Method of rolling steel strips from a hot billet or the like. W. Rohn, Germany. 2-6-34.

(60) 2,027,293. Method of rolling section

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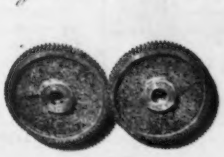

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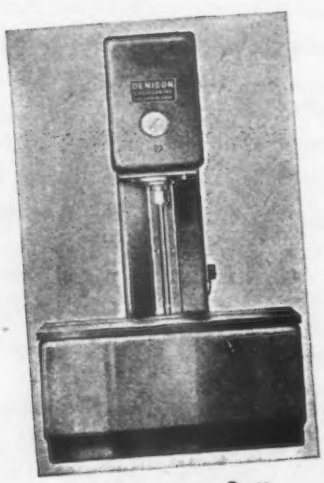

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bars of iron or other metals which have local raised portions or depressions varying in magnitude, transversely to the direction of rolling, such as ribs, serrations and the like. H. Selferth, Germany. 1-7-36.

(60) 2,154,534. Method of manufacturing annular disks. H. Schuster, Germany. 4-18-39.

(60) 2,222,372. Reheating method for the manufacture of long rolled profiled pieces of any desired sectional shape such as bars, wires and the like and furnace for carrying out that method. H. Puppe, Germany. 11-19-40.

(62) 1,617,936. Tube mill and process. O. Bamberger, Germany. 2-15-27.

(62) 1,626,481. Method of rolling tubes by the so-called Swedish process in which the pierced round is passed through blooming and roughing mills over a mandrel for the purpose of rolling the round into a long hollow bloom. J. Roeder and W. Wellmann, Germany. 4-26-27.

(62) 1,767,896. Method of and apparatus for rolling tubes from a hollow block. M. Roeckner, Germany. 6-24-30.

(62) 1,789,721. Production of seamless metal tubes. E. Alvermann, Germany. 1-20-31.

(62) 1,808,957. Manufacture of seamless tubes by rolling. W. Kunst, Germany. 6-9-31.

(62) 1,823,080. Method for the manufacture of seamless tubes from hard material such as alloyed steel, special steels and the like. O. Bamberger, Germany. 9-15-31.

(62) 1,837,161. Method of rolling tubes on plug rolling mills. W. Herz, Germany. 12-15-31.

(62) 1,849,973. Device for rolling tubes by means of which simultaneously with the rolling of a tube and in the same heat the finishing and sizing operation can be carried out; for the rolling operation use is made of a pilgering mill. R. Buchwald, Germany. 3-15-32.

(62) 1,867,120. Means for rolling out a tube with an internal thickening at the rear end from a tubular blank. A. Vollmer, Germany. 7-12-32.

(62) 1,898,779. Method of rolling tubes with internally thickened ends. L. Klein, Germany. 2-21-33.

(62) 1,999,324. Method of producing an end thickening in tubular bodies made by rolling with skew rolls. H. Esser, Germany. 4-30-35.

(62) 2,010,400. Method of manufacturing tubes and pipes. L. Klein, Germany. 8-6-35.

(62) 2,011,907. Method and apparatus for producing seamless tubes, particularly thin walled tubes. F. Peters, Germany. 8-20-35.

(62) 2,042,552. Process for producing seamless tubes from hollow billets by means of several pairs of rolls arranged around the billet a certain distance from its axis, one roll of each pair acting on the wall from the inside and the other on the wall from the outside. M. Roeckner and J. Severin, Germany. 6-2-36.

(63) 1,894,988. Process of rolling steel wire to be wire-drawn in which the steel wire is successively subjected to rolling operations. H. Weirel, Germany. 1-17-33.

(63) 1,913,711. Process for the production of forged shafting. F. Kamp, Germany. 6-13-33.

(66) 1,804,879. Method of rolling metals and apparatus therefor. K. Karius, Germany. 5-12-31.

(66) 1,850,026. Method of rolling channel sections with wide flanges. J. Meiser, Germany. 3-15-32.

(6) 2,296,565. Device for rolling threads particularly circumferentially uniform threads. K. Mutze, Germany. 9-22-42.

(60) 2,305,793. Continuous method of rolling metallic broad bands and strips, and particularly to the hot-rolling of steel bands and steel strips of which the width is greater than 600 mm. H. Punpe, Germany. 12-22-42.

(11) 1,773,004. Mandrel for use in rolling machines. E. Keller, Czechoslovakia. 8-12-30.

(13) 1,610,593. Method of rolling seamless pipes from a rotating hollow block by separating part of the material of the block from the remaining part by the utilization of roller pairs of gradually increasing width and of adjustable working depth. M. Roeckner, Germany. 12-14-26.

(13) 1,903,676. Rolling mill for widening out tubes. H. Heetkamp, Germany. 4-11-33.

(13) 1,939,524. Rolling mill for the manufacture of thin walled seamless tubes from a pierced or otherwise hollowed billet. H. Schimmel, Czechoslovakia. 12-12-33.

(13) 1,939,526. Process and apparatus for expanding metal tubes over their entire length by means of oblique rolls. A. Steinecke, Czechoslovakia. 12-12-33.

(13) 2,305,794. Device for adjusting inner rolls in rolling mills for rolling pipes. M. Roeckner, Germany. 12-22-42.

(14) 1,928,741. Rolling mill of the pilgrim-step type for the manufacture of metallic

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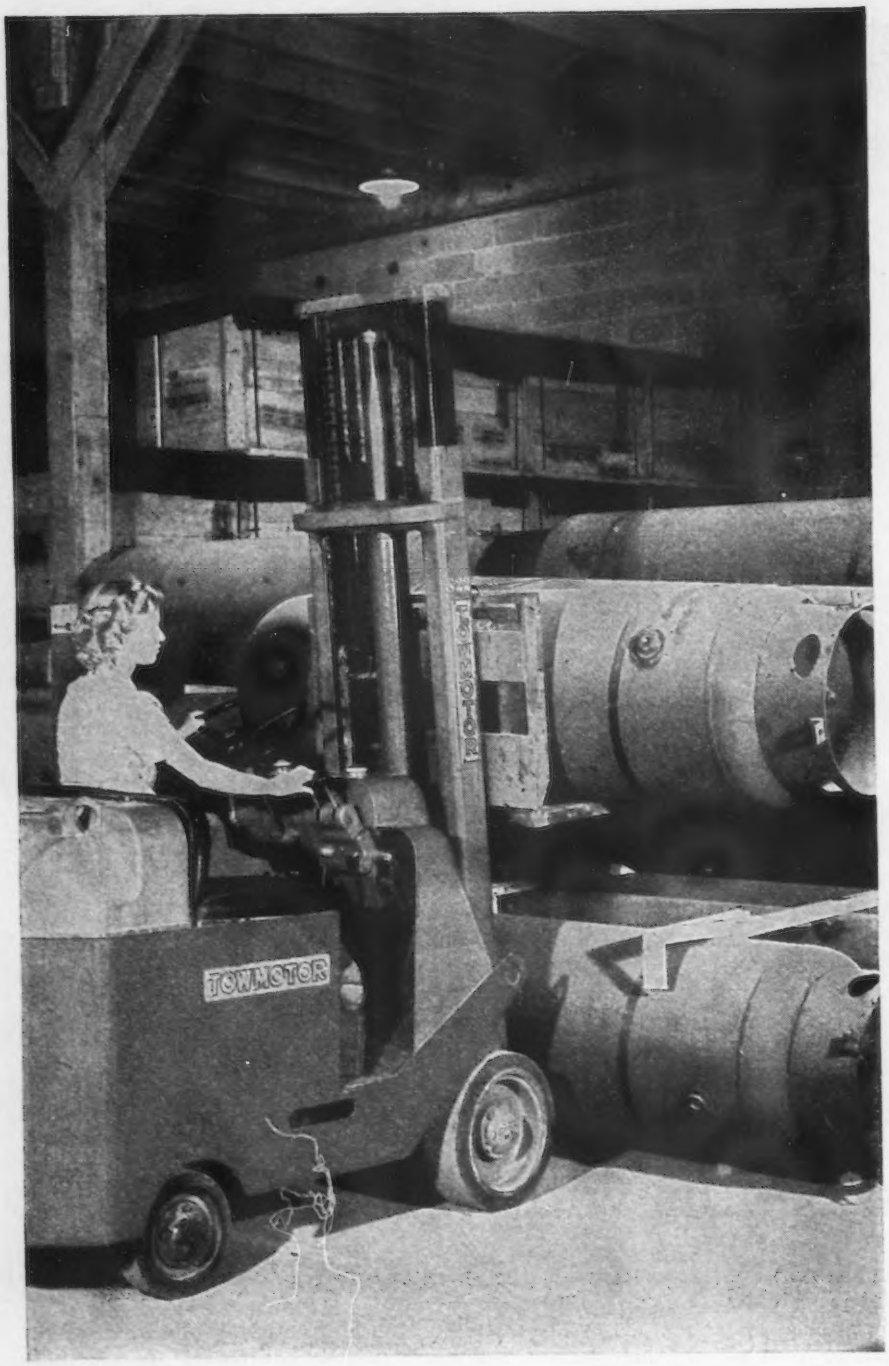

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tubes. L. Tschulenk, Czechoslovakia. 10-3-33.

(14) 2,160,742. Tube rolling mill in which the rolling is effected by means of external rolls and an internal mandrel which carries the tube blank and is arranged to receive a to-and-fro movement toward and away from the rolls and to be rotated about its axis when moved in one sense. M. Landrien, France. 5-30-39.

(16) 1,605,755. Manufacture of web plates for vehicle wheels in which an annular disk is used, to which disk the metal rim adapted to carry the tire is attached, and the disk and the rim carrying said tire are adapted to be detachably connected to the hub of the wheel. A. Michelin, France. 11-2-26.

(32) 2,099,082. Process for the rolling of thin sheet metal by the reversible process. L. Saives, France. 11-16-37.

(35) 1,865,941. Method for the rolling, or analogous treatment, of strips, wire or the like having a great length, by passing the bands through several successive trains of rolls. R. Michel, France. 7-5-32.

(38) 1,655,063. Rolling mill with supported working rolls. A. Kriwan, Czechoslovakia. 1-3-28.

(42) 1,730,012. Rolling mill particularly to shear tables employed in such mills for the cutting of the rolled products. L. Lowry, Germany. 10-1-29.

(48) 1,930,420. Ingot tilter which is used for laying an ingot down on a feed or roll table after it has been deposited on such a table in an upright maner by a crane or similar transferring apparatus. E. de Donato, Luxemburg. 10-10-33.

(54) 1,930,410. Reversing rolling mill for the manufacture of sectional girders, etc., having advanced friction roll mechanism, the rolls of which are also driven. J. Baugnee, Luxemburg. 10-10-33.

(54) 1,963,905. Rolling mill especially adapted for hot and cold rolling of metal bands and sheets. K. Huber, Czechoslovakia. 6-19-34.

(56) 1,614,612. Rolling mill and in particular a means for axially adjusting the housings or bearings of the rolls, which step becomes necessary for exact adjustment of the gaging sections. R. Hein, Czechoslovakia. 1-18-27.

(56) 1,856,170. Rolling mill consisting of a rolling mill housing in which a movable roller is adjusted in such a manner that during the rolling operation it bears upon the columns through the intermediary of members adapted to adjust its lifting. J. Roux, France. 5-3-32.

(62) 2,256,426. Process for manufacturing seamless tubes on a pilgrim step rolling mill. R. Damien, France. 9-16-41.

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Increase your production, decrease costs, make a better finished product with Titan Hot Pressed Parts. They can be engineered in surprisingly intricate shapes and thin sections. Dense, fine grained structure, sharp outlines and dimensional accuracy save machining, prolong tool life and minimize scrap. Whether your interest is for quick war production service or for future planning, you'll enjoy Titan's friendly, personal, prompt attention to your inquiry.

Titan

METAL MANUFACTURING CO.
BELLEFONTE, PA.

Quality Alloys by Brass Specialists

BRASS AND BRONZE RODS • FORGINGS
DIE CASTINGS • WELDING RODS

These Double-Wall Crane Wheels *Lasted 20 Years in Heavy Duty . . . .*

The 18-inch manganese steel crane wheels of our customer's double-wall design, shown in R-342, replaced identical Amsco - made wheels which had run for 20 years on a car builder's foundry cranes.

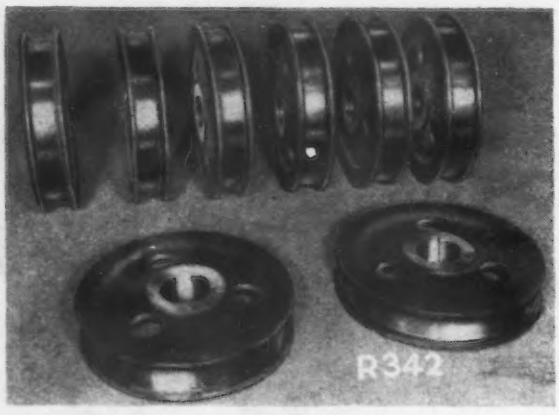
The customer wrote:

"We believe that 20 years' performance under our hard usage is unusual even for manganese steel wheels. At any rate we are not likely to buy any other kind for such service if for no other reason than that it would take just too long for a possible superiority to be demonstrated."

Any sound, well-designed, properly heat - treated crane wheel made of austenitic manganese steel will usually give good service. But single-wall wheels have at times shown a tendency to crack in the web at flanges or hub; and to overcome this possibility the Amsco double-wall design (see A-282 and our sketches) was developed.

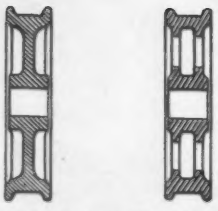
The flanges in this type are continuous with the walls, giving high resistance to side thrusts; and the walls are internally connected by cross members, which afford a strong support for tread and flanges. The work-hardening property of "the toughest steel known" assures a long-wearing tread.

A convenient means of obtaining prices is our crane wheel questionnaire form, sent on request.



R-342 Manganese steel wheels like these lasted 20 years.

A-282 and sketches show the Amsco double - wall construction.



SINGLE WALL DOUBLE WALL

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

Converting Contracts On Incentive Bas

Washington

• • • **Reports made by the War** and Navy Departments and the Maritime Commission to James F. Byrnes, director of War Mobilization, disclose that cost-plus-a-fixed-fee war contracts are being converted whenever possible into employer incentive and fixed price contracts.

The significance of this action is that progress definitely is being made toward: (1) Reducing the cost of war materials; (2) eliminating conditions which have caused some war contractors to hoard labor; (3) eliminating waste of manpower and money.

When our war preparations program began, the procurement agencies of government undertook to secure fixed-price contracts. It developed, however, that procurement agencies could not secure the needed production of war goods under fixed-price contracts because manufacturers were without experience in producing war materials and had no basis on which to estimate their costs. To meet this situation a cost-plus-a-fixed-fee contract was developed, the fee being a fixed amount of dollars which did not change with variations of cost.

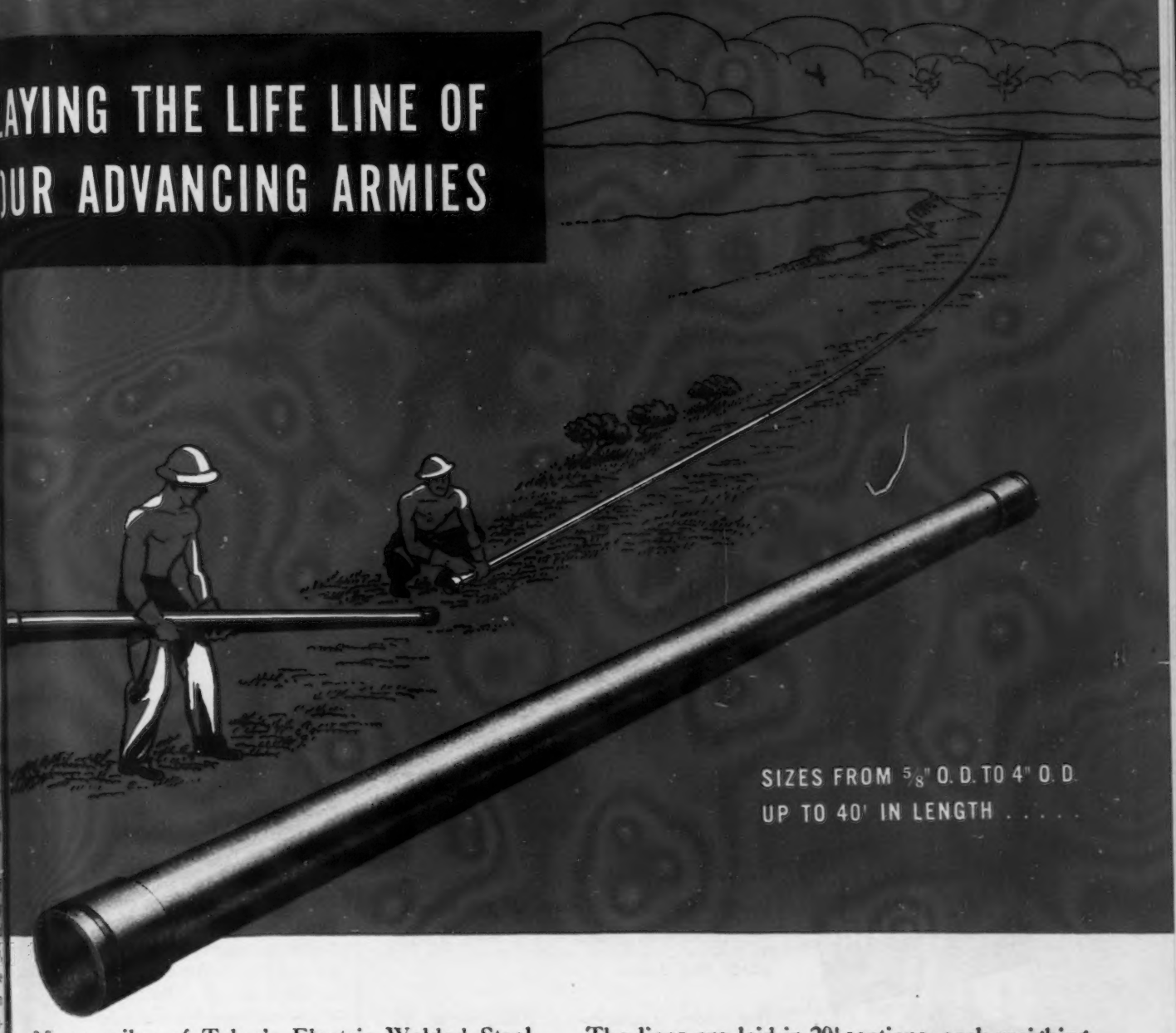
There remain a large number of cost-plus-a-fixed-fee contracts, mostly in the Navy and in the Air Corps and Ordnance Department of the Army, and these procurement agencies are actively engaged in trying to obtain the consent of contractors to converted type of contracts.

On Jan. 28, the Navy Department announced a policy of using fixed price contracts wherever possible and of discouraging cost plus fee contracts for war materials and supplies. The Navy's Bureau of Ships is studying the best means of converting ship contracts, and instructions have been given to each Navy Bureau to examine outstanding future contracts with the idea of converting wherever possible.

The War Department early in 1942 authorized two modified forms of fixed-price contracts providing for the setting of a tentative original price and then fixing the final price after part performance.

In January, 1943, the War Department authorized a new type of contract article providing for periodic adjustment of prices. Under it long-term contracts are divided into a series of pricing periods extending for four

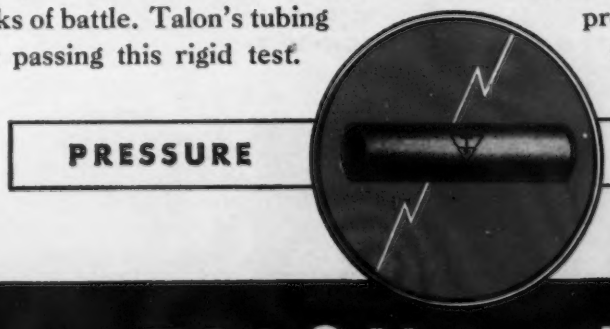
LAYING THE LIFE LINE OF OUR ADVANCING ARMIES



Many miles of Talon's Electric Welded Steel Tubing connect supply bases with combat areas. Known as "invasion lines," these vital arteries carry the "blood stream" of our mechanized forces—gasoline, oil, and water. Each type of product flows through separate 4" lines at a 6,000 bbl. daily rate. The requirements of such installations are light weight for ease and speed of placement in the field, and great strength to withstand the shocks of battle. Talon's tubing is successfully passing this rigid test.

The lines are laid in 20' sections, each weighing only 70 lbs. The light weight enables a skilled crew to lay up to 10 miles per day. Extra heavy nipples are welded onto the light wall tubing for coupling in the field. Another indication of the great strength of Talon's tubing—the lines follow natural contour of the land without trenching.

Talon's Electric Welded Steel Tubing, both pressure and mechanical, is available for prompt delivery in sizes from 5/8" to 4" O. D. in lengths up to 40 feet.

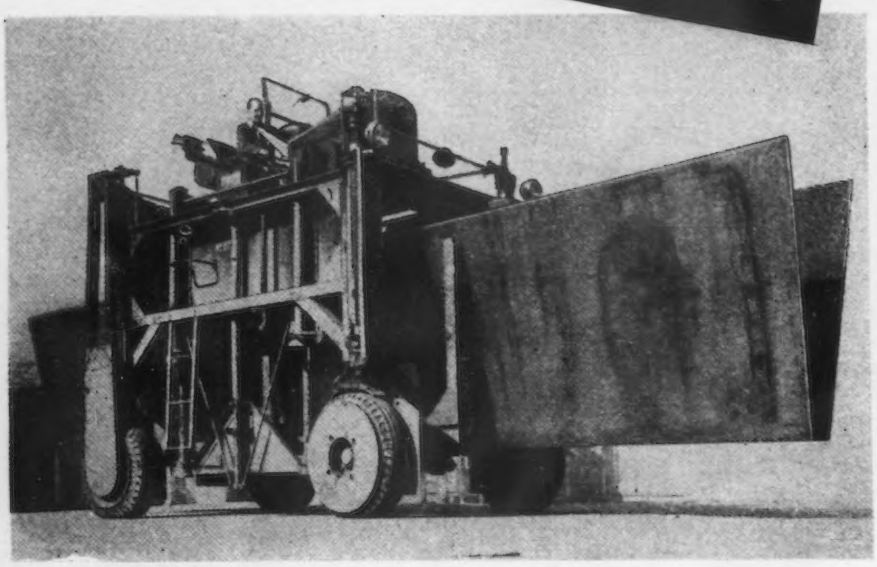


TALON . . INC.

STEEL TUBE DIVISION — OIL CITY, PENNA.

WHAT DO YOUR HEAVY HANDLING JOBS CALL FOR? ★

This Heavyweight CHAMPION CARRIER



A west coast shipyard economizes by hauling heavy steel plate with a Ross Model 90 Carrier.

or This Rugged LIFT TRUCK

Rapid movement and quick loading mean everything in these days of transportation strain and congestion in mills, freight yards and docks.

The heavy capacity of Ross Series 90 Carriers; the maneuverability and short turning radius of Ross 70 H Carriers, with 4½ ton capacity, and Ross Heavy-Duty Hydraulic Lift Trucks, 3 to 7 ton capacities, furnish the answer to many of your handling problems.

Bulletin I-123, which tells the full story of these useful, durable, economical machines, will interest you. Write for it today.

THE ROSS CARRIER COMPANY, BENTON HARBOR, MICHIGAN

★ ROSS ★

HEAVY DUTY MATERIALS-HANDLING EQUIPMENT

BENTON HARBOR • MICHIGAN

six months each. The contract price is fixed for only one period and is adjusted either upward or downward for the next period by negotiation based on conditions then prevailing, and the contracting officer is authorized in his discretion to exempt from statutory renegotiation the price fixed for any period. The exemption from renegotiation provides a means for obtaining a close price and for maintaining maximum incentives for reductions in costs during each period.

At about the same time the War Department authorized another contract article to provide incentives in cost-plus-a-fixed-fee contracts by adjusting the fee inversely for differences in costs to reward efficient performance. Under it a target estimate of cost is fixed after part performance and the fee is increased if the costs are reduced through efficiency or is decreased if the costs exceed the estimate.

Mr. Patterson reported that in accordance with this policy the War Department has made extensive efforts for more than ten months to convert to fixed-price basis through both the Air Forces and the Ordnance Department, which are the only War Department services making cost-plus-a-fixed-fee supply contracts to any important extent. The Army Air Forces, from Jan. 1, 1943, to Sept. 15, 1943, have converted about $170,000,000 in face amount, but still have outstanding approximately 343 cost-plus-a-fixed-fee contracts with about 133 contractors, Mr. Patterson reported. These unconverted contracts represent more than 40 per cent of the dollar volume of the Air Forces' expenditures. Most of the stable items of Air Forces equipment are purchased on a fixed price basis.

The Army Ordnance Department on last April 15 had 54 cost-plus-a-fixed-fee contracts to which the conversion program applied and since then four have been added and seven have been completed or terminated—making a total of 51. Of these, two have been converted, commitments have been obtained from contractors to convert four more and it is hoped to be able to convert about five more in the near future. Efforts have been made to convert the remaining 40 but it has been felt that conversion of at least 20 of these is not feasible. Some of them will be completed or terminated before the end of the year.

The Under Secretary's report pointed out several major obstacles to conversion as demonstrated by the

IMMEDIATE DELIVERY...
RACO 11 ELECTRODES!

Yes, we mean it! You can now count on immediate delivery of RACO 11

...the electrode that the Welding Foreman of one of the largest shipyards calls "the best his crew has worked with... an electrode that assures the user X-Ray clean welds free from gas pockets and slag inclusion."

...the electrode that has proved to be the ideal utility electrode... that can be used on AC or DC... and give superior results on mild steel in all positions.

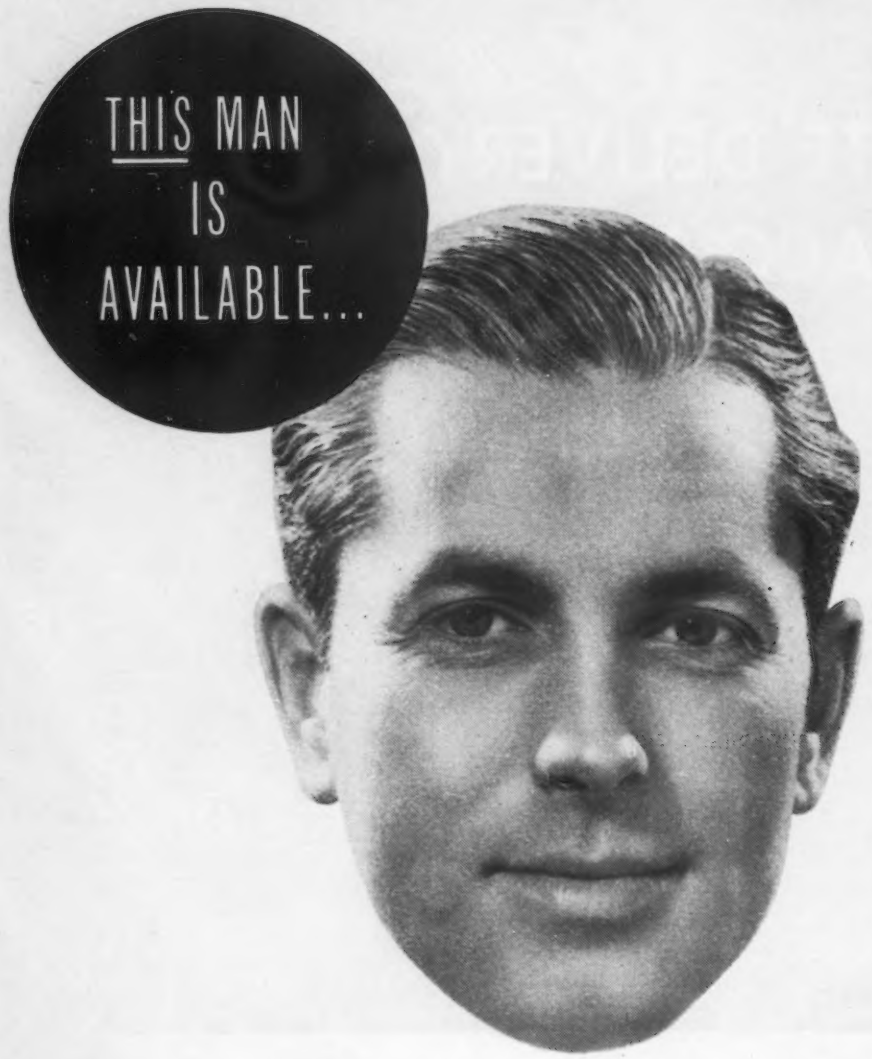
...the electrode that complies with the following specifications:

A.W.S.—A.S.T.M. Filler Metal Specifications A233-42T Classification E6011; Navy Bureau of Ships Specification 46E3, Grade III, Classes 1, 2, 3; American Bureau of Shipping Specifications HIG and BIG; A.S.M.E. Boiler Code, Paragraph U68.

All those features... plus immediate delivery! Write NOW for samples of RACO 11 ... and full information on RACO electrodes for every welding job.

The REID-AVERY COMPANY

DUNDALK BALTIMORE 22 MARYLAND



The Wyandotte Representative can be in your plant if you wish. He can provide skilled technical help on your metal cleaning problems . . . help he's been trained by many years of *know-how* to provide.

Under wartime pressure, metal finishers can't wait. When one job's finished, another is instantly at hand. And that means the *swiftest* and most exacting cleaning and degreasing operations are indispensable.

Wyandotte Metal Cleaners provide the answer . . . *best* results, *big* savings. Compounds for armament and airplane parts manufacturing, automotive equipment, and for use in water wash spray booths are all Wyandotte specialties.

Let Wyandotte help chart your way to peak efficiency in all cleaning and degreasing operations. Just call in the Wyandotte Representative. He's at your service 24 hours a day.

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

WYANDOTTE CHEMICALS CORPORATION
J. B. FORD DIVISION, WYANDOTTE, MICHIGAN

● *Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs*

War Department's efforts so far, as follows:

(1) The rate of production of certain items fluctuates so rapidly and so widely that the resulting variations in the costs of production make it almost impossible to fix a reasonable price without heavy contingency allowances or constant adjustment of the price.

(2) Many of the fixed-fee contractors, especially with the Air Forces have so little previous experience with production of their present products or depend so heavily on subcontractors in this condition, that they are unable to estimate their cost with reasonable accuracy.

(3) Many of the contractors under fixed-fee contracts have only moderate amounts of capital but are doing an enormous volume of business totally disproportionate to their capital, and are entirely unwilling to assume the risks inherent in the fixed price contract for fear that even small errors might ruin the company entirely.

(4) With the tremendous expansion of business, management and engineering personnel in some companies has been spread so thin that they are either unable or unwilling to divert their time and energies to prices instead of to production.

(5) The instability of labor conditions in certain areas makes estimates of labor costs extremely uncertain.

(6) Certain of the fixed-fee contractors, especially with Ordnance, have undertaken to manage plants producing articles totally different from their commercial business, often they are not willing to embark on a business venture in such fields, desiring neither the attendant profits nor the risks.

The War Department to meet such circumstances has studied the so-called "incentive-type contracts," sometimes known as "target price contracts," and has authorized a form of contract provision which in effect makes the contractor's fee depend on his record in controlling costs. The fixing of an accurate "target" or estimate of cost is the heart of this provision, since an inaccurate estimate will reward or penalize the contractor on a fictitious basis. Under provisions governing Army contracts, the "target" is fixed after the contractor in question has performed part of the contract involved, since most experience with such clauses have indicated that the "target" estimate should be based on the actual cost experience of the particular contractor.

The Army's Ordnance Department has recently used another method of providing incentives for efficiency in cost-plus-a-fixed-fee contracts at government-owned privately-operated small arms ammunition plants. This involves a contract provision for periodic review of contracts to include comparison of operations costs with other similar plants, the extent of effective utilization of manpower and the volume of production during the last half of 1943 and the scheduled production during the first half of 1944.

Admiral Emory S. Land, Chairman of the Maritime Commission, reported fewer than 100 vessels covered by cost-plus-a-fixed-fee contracts.

The Maritime Commission, aside

PARISH

METAL STAMPINGS

★

MODERN DESIGN AT LOW COST

★

HOUSEHOLD APPLIANCES

New refrigerators, cabinets, bathtubs, stoves, and a wide range of other household necessities will be a joy to the post-war housewife.

Pressed Metal Parts and stampings will make possible unparalleled efficiency, smart beauty, long life,—all those qualities that lower sales resistance in a competitive world.

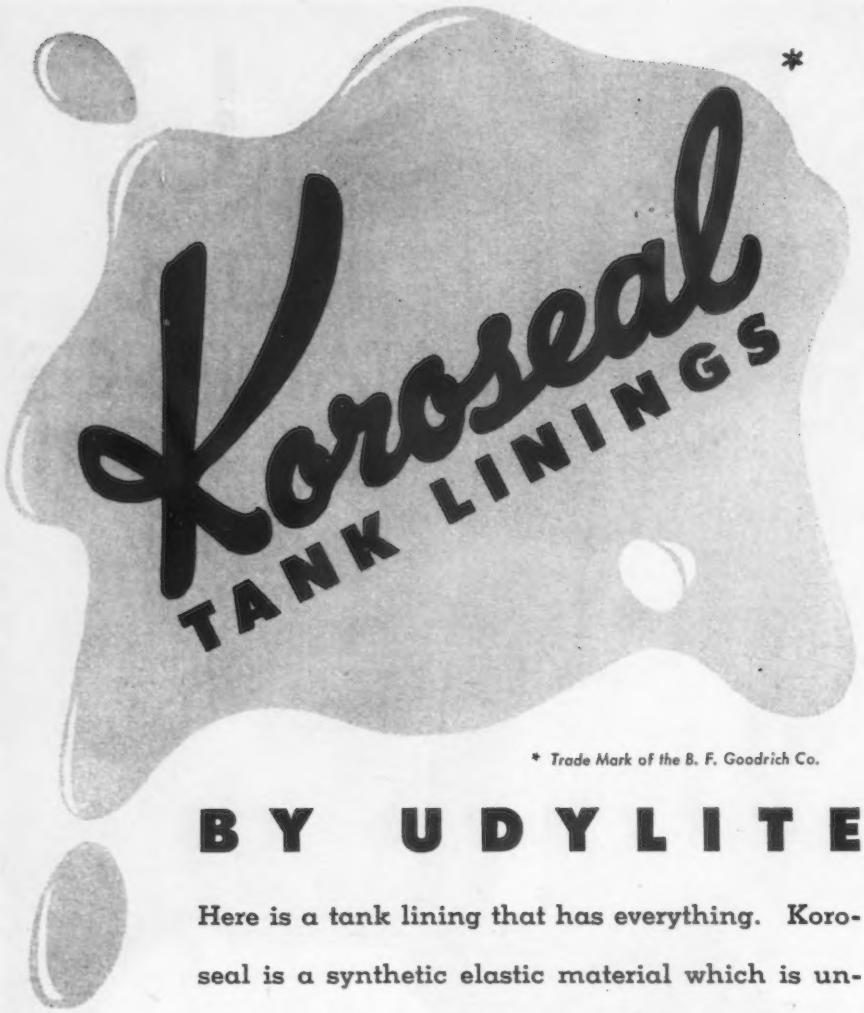
No other method provides *all* characteristics required,—resistance to elements, ability to take hard knocks in every day use, relative low cost, tensile strength, beauty and so forth. Parish Pressed Steel has completely rounded facilities; engineering cooperation in the drawing board stage, all sizes of presses for most efficient production, welding facilities, painting and finishing departments, and full assembly facilities.

It is not too early to plan your new designs. We are ready to work with you in the preliminary stages.

And as our contribution to post-war progress, we are now equipped to stamp, fabricate, and heat treat aluminum, in addition to steel.

ARMY E NAVY

PARISH PRESSED STEEL CO., Reading, Pa.
Subsidiary of SPICER MANUFACTURING CORP.
Western Representative: F. Somers Peterson, 57 California St., San Francisco, Cal.



* Trade Mark of the B. F. Goodrich Co.

BY UDYLITE

Here is a tank lining that has everything. Koroseal is a synthetic elastic material which is unusually resistant to oxidizing acids and corrosives.

Koroseal is quickly and easily applied directly to wood, steel or other surfaces by means of specially developed adhesives. No vulcanizing. Approximately 100 lbs. per square inch bonding strength.

This material allows practically no absorption of chemical solutions and it does not contaminate plating bath.

Koroseal is unaffected by oils or grease. Resists abrasion well and it is easily and quickly repaired.

● **Write for our new detailed bulletin on this *better* tank lining** ●

THE UDYLITE CORPORATION

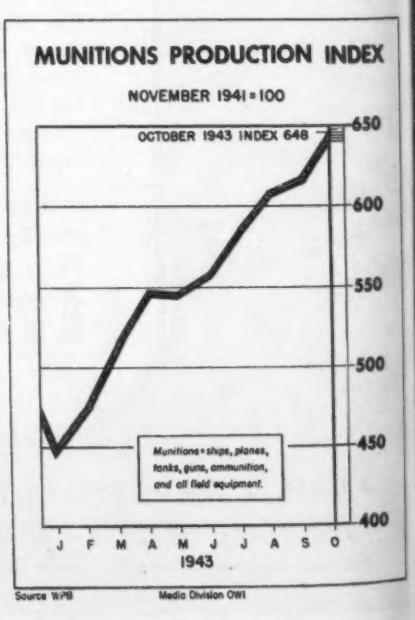
1651 E. Grand Blvd., Detroit 11, Mich.

Chicago 12, 1940 Walnut Street
Long Island City 1, N. Y., 11-16 44th Drive
Cleveland 3, 4408 Carnegie Ave.

from these exceptions, has three types of contracts for construction of vessels, "fixed price contracts" aggregating $325,000,000, "price-minus" contracts aggregating $1,900,000,000 and "man-hour" contracts aggregating $3,500,000,000.

The "price-minus" contracts, used for the more complicated, nonstandardized vessels, assures the private shipbuilder reimbursement for all of his legitimate costs plus a small minimum fee, and it also provides an incentive for reduction in cost and in use of manpower. If the shipbuilder reduces his cost below his estimate, his fee is increased. In effect the contractor and the government share savings below the contract price so that the contractor who reduces his manhours or otherwise effects economies gets one-half the savings added to his minimum fee and the Commission gets the ship for the contract price minus half the savings—hence the term "price-minus."

The "manhours" contract used for Liberty and Victory ships is similar in general effect, but it places the emphasis upon manhours rather than dollars of cost. This is practicable because of the high degree of standardization and because of the fact that virtually all the parts and material for these ships are purchased directly by the Commission and sent by it to the shipyards. The contractor is therefore concerned mainly with economy of labor. A normal number of manhours is stipulated in the contract and if this is realized in the actual building of the ship, a normal fee is paid. If the normal number of manhours is exceeded, the fee is reduced; if it is bettered, the fee is increased.



When design changes suddenly demand transition to new steels — you can make the changeover *faster* by filling in from Frasse warehouse stocks.

Frasse stocks — now fairly well rounded — are immediately available to carry production loads until mills can ship. Emergency quantities of Frasse cold finished bars, tubing, stainless steels, alloy and aircraft steels and tubing can be put to work while your mill order is still awaiting scheduling.

Available, too, are Frasse technicians to help you get maximum benefit from Frasse stocks and services — experienced counsel in substituting, fabricating, and scheduling. Frasse steels and personnel have engineered scores of changeovers until mill shipments arrived. Call Frasse. *Peter A. Frasse and Co., Inc., Grand St. at Sixth Ave., New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Ave., Philadelphia 29, Pa. • (Radcliff 7100-Park 5541) • 50 Exchange Street, Buffalo 3, New York (Washington 2000) • Jersey City, New Jersey, Hartford, Conn., Rochester, N.Y., Syracuse, N.Y.*

Frasse

Mechanical and Aircraft STEELS

SEAMLESS MECHANICAL AND AIRCRAFT TUBING · COLD FINISHED BARS · ALLOY STEELS · AIRCRAFT STEELS
STAINLESS STEELS AND TUBING · DRILL ROD · COLD ROLLED STRIP AND SHEETS · WELDED STEEL TUBING

How a BAKER CRANE TRUCK solved a tough problem for Bailey Meter Co.

PROBLEM: To obtain greatly increased production without external plant expansion.
Baker
SOLUTION: Utilization of overhead space by constructing mezzanine floors, and substituting Baker Truck for traveling craneways removed. Truck also saves time and space at other points throughout plant.

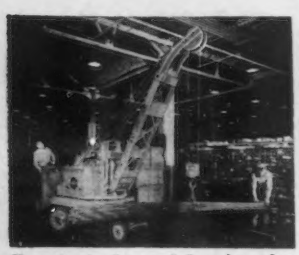
Bailey products range from small instruments weighing less than 10 lbs. to complete control panels weighing more than a ton. In their manufacture, a wide variety of castings, bar stock and other materials require handling—from incoming carriers, in plant and warehouse, and to shipping. Besides substituting for removed overhead cranes, truck is used to relieve congestion on others, to handle material beyond their limits, to assist in the erection of control panels, to tier material for conserving space in storage, and for a wide variety of operations which were not anticipated when truck was purchased. Thus the company was enabled to attain increased production without increasing plant size.

In erection of control panels, Baker releases overhead cranes for other work.

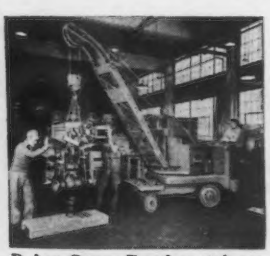
Small parts in standard boxes are tiered by Baker Truck to conserve space.

A Baker Material Handling Engineer may solve similar problems for you. Check with him now for current or post-war needs, or write us direct.

BAKER INDUSTRIAL TRUCK DIVISION
of the Baker-Raulang Company
2175 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.



Transferring bar stock from incoming cars to storage with Baker Crane Truck.



Baker Crane Truck spotting a large valve in position for crating.

Handling panels boxed for shipment—an awkward job made easy by Baker Truck.

1608-1A-43

Baker INDUSTRIAL TRUCKS

sharing the savings between the contractor and the government.

The "manhours" contract policy was adopted by the Commission early in 1941, and its wisdom, according to Chairman Land, is demonstrated by the fact that total manhours required for building a Liberty ship before have been reduced from an estimated figure of 648,432 manhours to as low as 336,846.

The "fixed-price" contracts of the Commission also provide a strong incentive for reduction in both manhour and dollar costs by subjecting profits included above a fixed figure to recapture—except that the contractor may increase his amount of profits if he decreases the contract price.

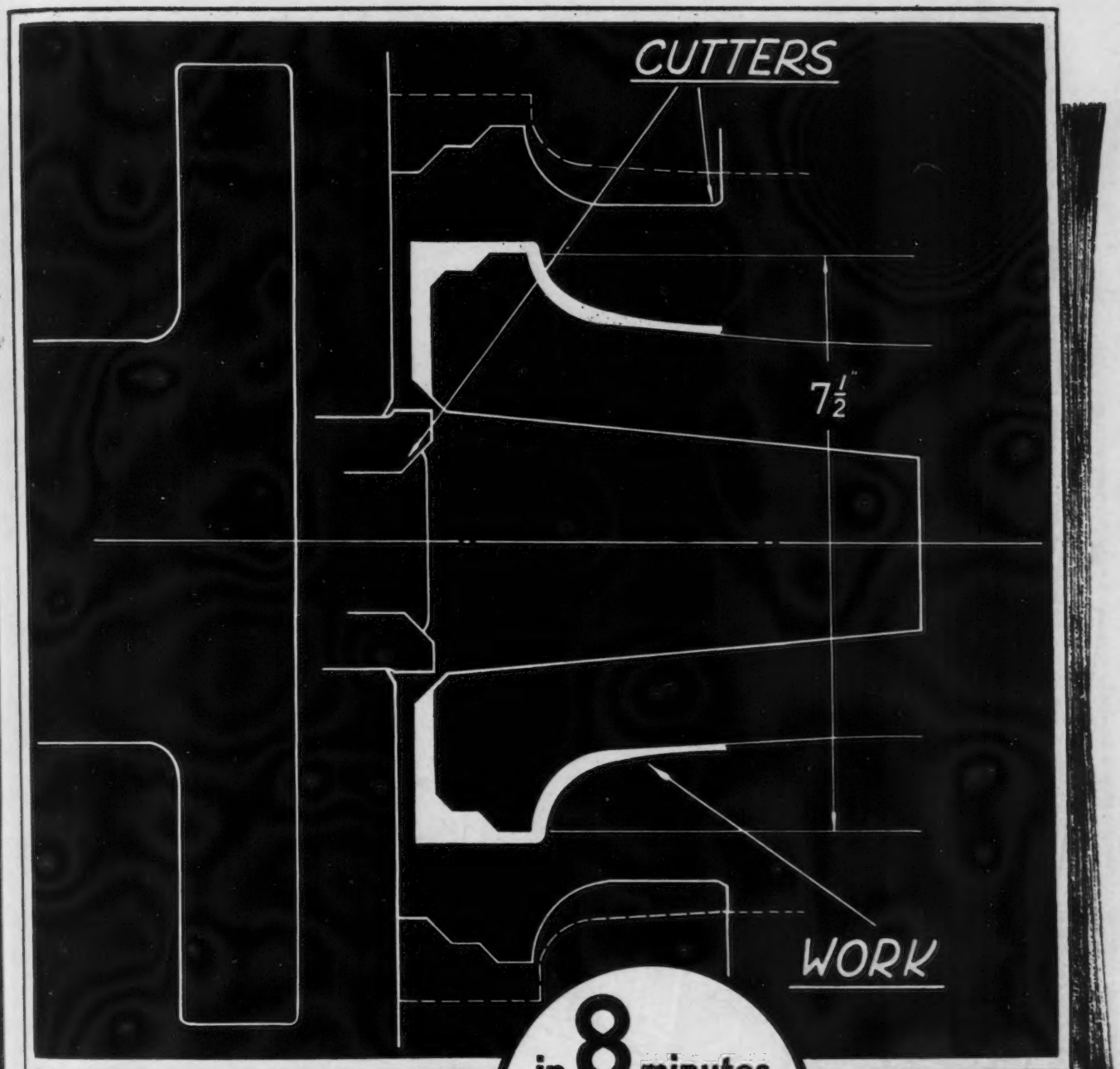
Uses of New Materials Subject of SAE Meeting

New York

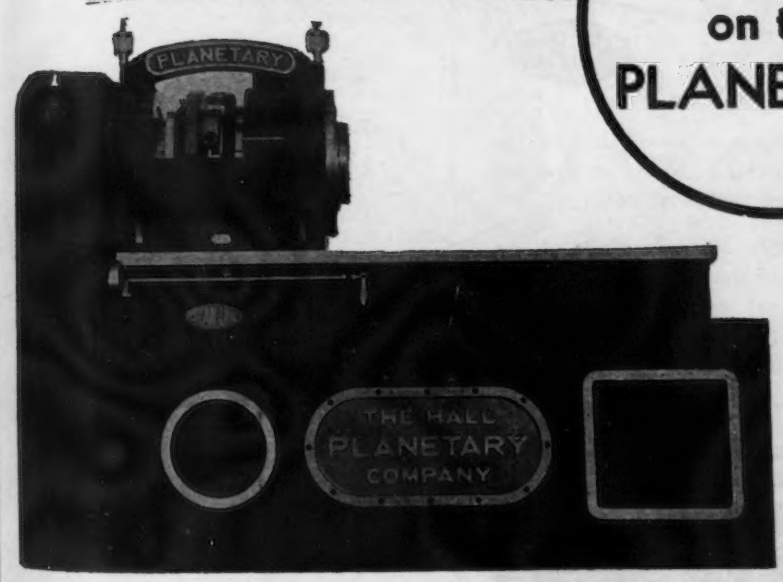
• • • **Potential industrial uses** of new materials such as plastics and synthetic rubbers and broader applications and new adaptations of established materials such as steel will be among featured subjects at the 1944 War Engineering-Annual Meeting of the Society of Automotive Engineers in Book-Cadillac Hotel, Detroit, Jan. 10-14.

The preliminary program provides for one entire session to be devoted to discussion of wartime developments in steels and their possible future uses, and to the wartime and post-war utilization of aluminum, magnesium, synthetic rubbers and plastics. Papers to be presented by experts in various materials fields will reveal to automotive engineers the potentialities of new materials and adaptations of old in post-war motor vehicle design and manufacture.

"BUT, DEAR, I'VE PROMISED TO STAY ON THE JOB!"



in 8 minutes on the PLANETARY



The machining of Propeller Shanks is completed in eight minutes each on the Planetary. This includes the simultaneous machining of all external surfaces as indicated by the heavy lines on the above drawing. Close "aircraft" accuracy is easily maintained on the Planetary well within the requirements. Send us your prints.

HALL PLANETARY COMPANY

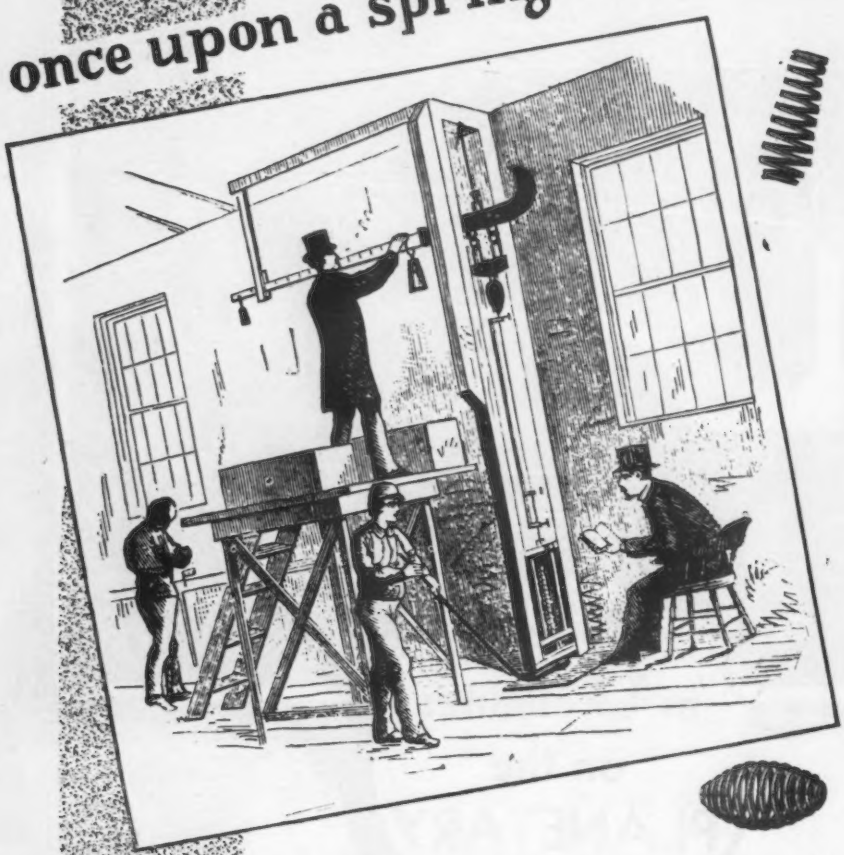
Fox St. and Abbotsford Ave., Philadelphia

TORRINGTON
Force Feed Mechanical
LUBRICATOR

Positive, never-failing force-feed bearing lubrication. Design flexibility also enables power takeoff from machine to front, rear, side or bottom by ratchet or rotary means. For complete information write, stating number of feeds and drive desired.

THE TORRINGTON
MANUFACTURING CO., TORRINGTON, CONN.

once upon a spring-*time*...



One of the first steps taken to establish scientific control of wire manufacture is recorded in this old illustration of a corner of an 1877 wire mill.

Torrington Spring Coilers take advantage of the uniformity that is possible in today's wire, and in the expert hands of professional springmakers produce rapidly and accurately extension, compression or torsion springs meeting the most exacting specifications.

No. 7, concluding a series.

THE TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

Plastics Replaces Aluminum in Bombers

• • • **On the** Liberator B-24 bomber, engineers of Consolidated Vultee Aircraft Corp. have substituted plastics and plywood for 66 parts formerly made of aluminum alloy. Fabrication of many secondary parts from these materials save approximately 45 per cent in weight compared to metal, and in most cases the cost is lower.

Plastics are used for such items as map cases, cable pulleys, cable guards, boxes for switches, brackets, knobs, and hand rails. One of the largest parts now made partly of plastic material is the side gunner's door. Another large part now being designed is a plastic wheel well fairing, which will fit under the wing when the undercarriage is in retracted position.

Before plastic parts are ordered installed in production planes, they are thoroughly tested under actual flight conditions. At extremely low temperatures plastics sometimes become brittle, and when subjected to high temperatures, the resins become soft, often causing the parts to become unusable. Within certain temperature ranges, however, plastics are entirely satisfactory. Plastics being used on Liberator parts will withstand temperatures as low as —60 deg. F. and up to 150 deg. F.

Plastics are usually made of 8 to 12 layers of laminated canvas or high grade fabric which are impregnated with phenolic resins, then subjected to heat and pressure.

•

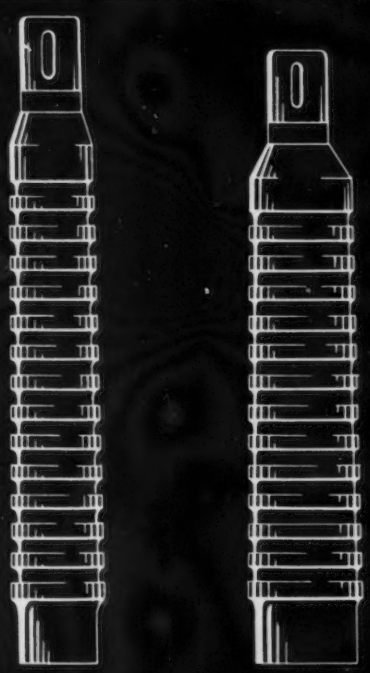
Cincinnati

• • • **A new method** of "forming" thermosetting laminated plastic material manufactured by the Formica Insulation Co. for wartime application on airplanes may open a field of new uses.

Demonstration of the method developed by William Beach, an engineer of North American Aviation Co., Ingelwood, Cal., to make laminated parts on planes manufactured by his company evoked suggestions for post-war applications at the recent wartime seminar conducted for Formica engineers and sales representatives from all parts of the country.

The Beach process involves rushing the properly heated sheet to a press with wooden dies and stamping it into shape in less than 15 sec. after it leaves the heating oven. Sharp bends can be made in sheets up to ⅛ in. thickness with an inside radius no larger than sheet thickness.

BOTH these Broaches are the right length



1"	HOLE DIAM.	1½"
.030"	STOCK REMOVED	.040"
2"	EFFECT. LENGTH OF HOLE	2½"
0.375	CU. IN. PER STROKE	0.628

for the specific job each performs

How to get more out of your Broaches------

BY USING CORRECT BROACH LENGTH

There is a correct broach length for best performance on any job, depending on type of material to be broached, amount of stock removed, etc.

If the broach is shorter than this, it usually means a bigger step per tooth and you may have to sharpen more frequently, you may have increased tooth breakage, or finish may be inadequate.

If the broach is too long you lose productive time without gaining anything.

The job of correctly calculating the proper length of a broach for any given job is not difficult but it does require the availability of empirical data on actual broach performance on similar applications, similar materials, etc.

We will be glad to put at your disposal the experience we have gained in calculating and observing thousands of broach installations and recommend the correct broach length for best overall results in any given setup.

colonial BROACH COMPANY

25th Anniversary

DETROIT 13, U.S.A.

Broaches — Broaching Machines - Broaching Equipment

METAL PARTS CLEANING

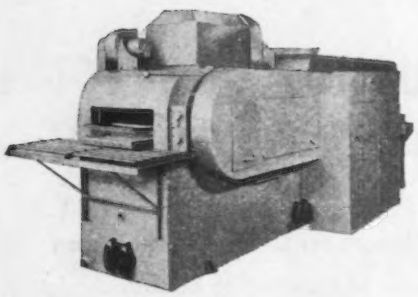
Low Cost .. Efficient

by the ORIGINAL "STURDY-BILT"

ACTIVE-SOAK *Method*

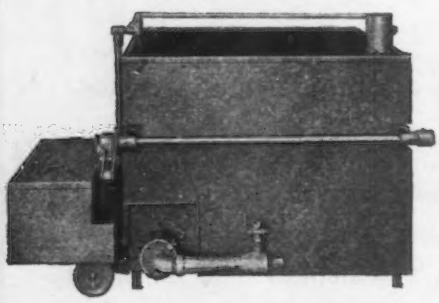
plus POWERFUL WASHES

SIMPLE • COMPACT



STURDY-BILT "Soaker Hydro"

A unit for positive, production line cleaning of metal parts, etc. Hot SOAKING PROCESS combined with powerful washing section. Equipped with a built-in Drying Unit and Chamber. Parts delivered properly cleaned and dried.



STURDY-BILT "Simplex"

A small, compact, mechanically simple unit combining ACTIVE-SOAK with WASHING ACTION. Removes oil, grease, chips from metal parts, assemblies, castings, etc. Can be installed individually in different departments or in a series for consecutive steps of cleaning, rinsing, coating or treating.

Also individually designed "Sturdy-Bilt" DRYING UNIT for drying operations of cleaned or coated metal parts.

INSTALLATIONS in Motor-parts, Aircraft, Electrical, Government and other War-material plants.

Send for complete details on either or both units

STURDY-BILT

EQUIPMENT CORPORATION

Dept. IA-122, West Allis, Wis.

Steel Developing Cancellation Policy

Pittsburgh

• • • **The increased speed** in the cancellations of steel orders has caused most steel companies to establish a definite procedure to handle this trend. In the beginning, most companies found that there were so many loose ends to be picked up, in the matter of cancellations, that loose handling might result in too many claims, lack of proper settlement, and unnecessary negotiations.

Such factors as: How much of the order had been produced, what form it was in, when it was to be scheduled, whether the steel company was a prime contractor or subcontractor, etc., are only a few which must be determined, quickly, in order that the cancellation problem does not "back up."

One steel company in this district has established a simple form, which contains sufficient data for the department head to make a decision as to whether the material can be cancelled, and whether or not claims are necessary. Furthermore, this procedure has been standardized throughout the company, and in itself requires a full investigation before the steel company makes any commitments to the customer requiring cancellation.

This standardizing of the cancellation procedure, which requires an approval of the comptroller of the company or his representative before the cancellation is made, has had a few of the following effects; All departments in the steel company involved become fully acquainted with the orders, supervision of the cancellations becomes "air tight," up-to-the-minute data is readily available, the speed of revamping steel schedules is enlarged, and, finally, there has been a substantial step-up in the speed of termination and the presentment of claims if they are necessary.

Form S-411

Cancellation Request Date _____

Customer's Name _____ Address _____

Customer's Order No. and Date _____ Mill Order No. _____

Are we ☐ Prime Contractor or ☐ Sub-Contractor. (Check which)

Date cancellation requested by customer _____ Date "hold" placed on order _____

*Reason given by customer for cancellation request.

Date scheduled for delivery of material wanted cancelled.

*Description and tonnage of material wanted cancelled

Original tonnage on the order. | Tonnage already shipped | Tonnage due and on "hold" and wanted cancelled

Was material wanted cancelled to be made from ☐ Steel of our Melting, or ☐ Purchased Steel. (Check) (Which)

*What does Mill report as to tonnage of Material in Process? On Hand? Ordered on the Outside? (Give date of Mill's written report and full details)

*Any expenditures for engineering work or purchased tools.

*If we are Sub-Contractors, when will Prime Contractor file his claim, if any.

Recommendation as to whether we should file any claim.

Signature of Department Head making this report.

Recommendation as to Claim, of General Manager or Asst. General Manager of Sales.

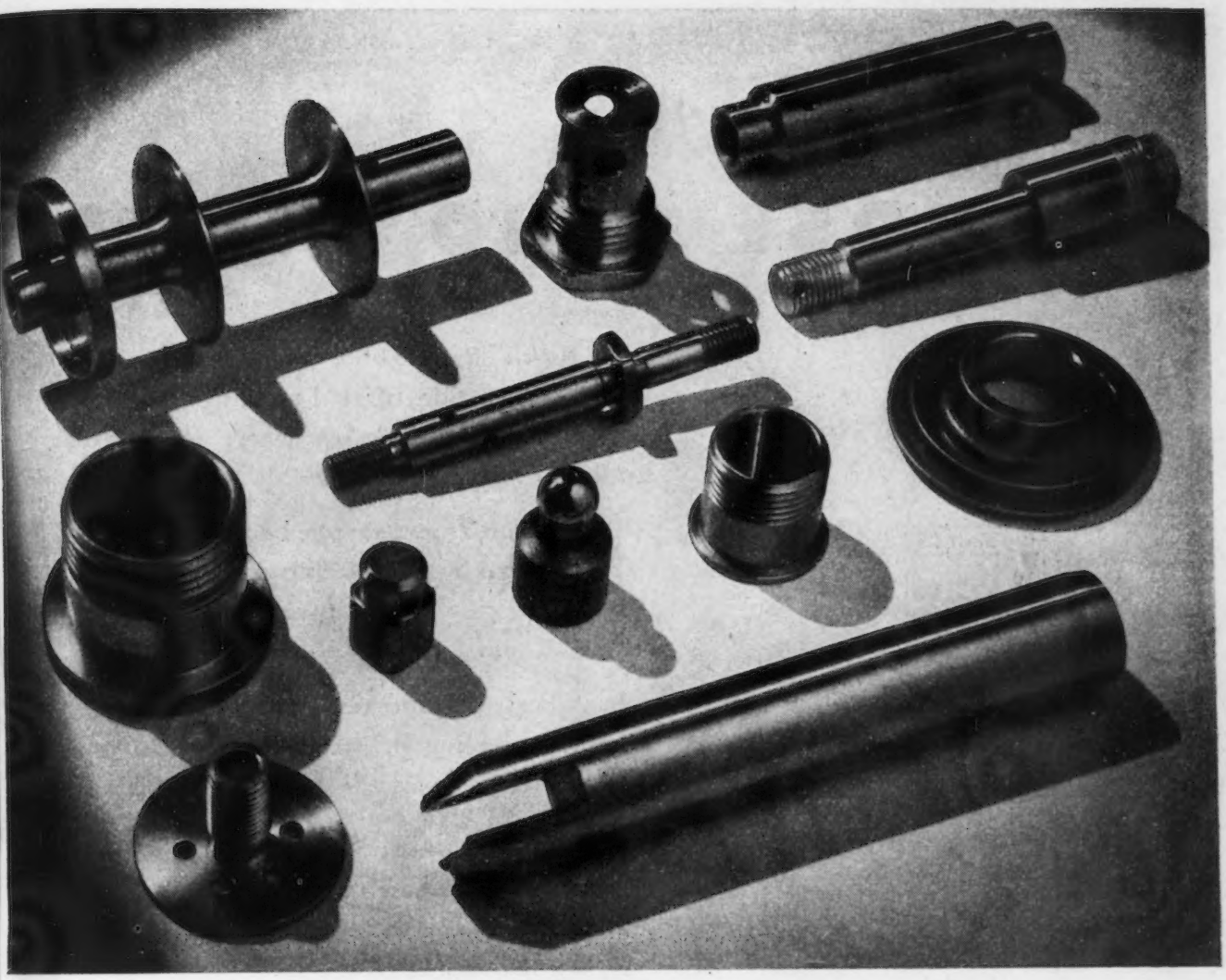
Date _____ General Manager of Sales.

Approved for Cancellation

Date _____ ☐ No Claim. ☐ Claim to be filed.

Signature of Comptroller or his representative.

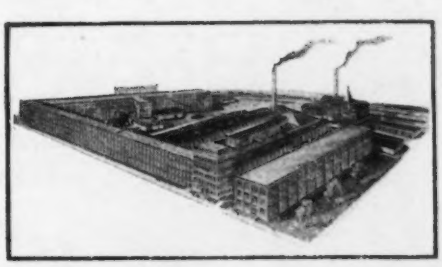
* Use supplemental sheet if necessary.
This form and any supplemental sheets are to be made in triplicate by Department Head in General Office. One copy is to be retained by Department Head and two copies are to be sent to _____ after approval by General Manager or Asst. General Manager of Sales.



Beyond a Single Machining...
...More than a Score of Finishing Processes

Nearly twenty years ago **Hartford** was asked to make precision screw machine parts for aircraft engines. There was no precedent, no pattern to follow. Blueprints and specifications didn't tell the complete story; machining and finishing these parts correctly required full understanding of expected performance. Results depended on **Hartford's** trained personnel. That confidence in our men was not misplaced.

Widely experienced, **Hartford** knows how to get the most out of machines in terms of precision production in large quantities. Screw machine capacity, 1/64 in. to 5 in. diameter; cold heading facilities, 1/4 in. to 5/8 in. by 4 in. long; wide variety of finishing equipment. Our nearly seventy years of experience in making special screw machine products, are your guarantee that you'll get the parts exactly as you want them at the right price.



Facilities for additional production become available from time to time even now . . . And, when V-Day comes, if you need the precision and ability that only a widely experienced manufacturer can offer, remember the first in the field. Hartford Machine Screw Company, Hartford 1, Connecticut.

HARTFORD

A Word

TO THOSE WHO PICKLE

CHEMICALS ACP PROCESSES

ACP Pickle Bath Toner is being utilized to improve the action of acid pickling and stripping baths in those cases where the use of Rodine is not indicated.

Pickle Bath Toner, supplied either as a liquid or powder, has little inhibiting effect and should, therefore, not be confused with the strong inhibitor, Rodine.

It, however, improves the effect of an uninhibited pickling or stripping bath. Among the improvements are:

Brighter and smoother surfaces
Reduction in drag-out
Better wetting of the metal
The removal of light films of oil
The formation of a thin, fume retaining blanket

ACP Pickle Bath Toner can be used alone in acid baths or with Rodine, the action and effectiveness of which is thereby enhanced.

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP **PENNA.**

Note: West Coast Plants may address inquiries and orders for prompt delivery to: Leon Finch, Ltd., 728 East 59th St., Los Angeles, Calif.

American Chemical Paint Company, Ambler, Pa.
Please send me general Technical Service Data Sheets on

☐ Pickle Bath Toner ☐ Rodine

*Name*_____ *Title*_____

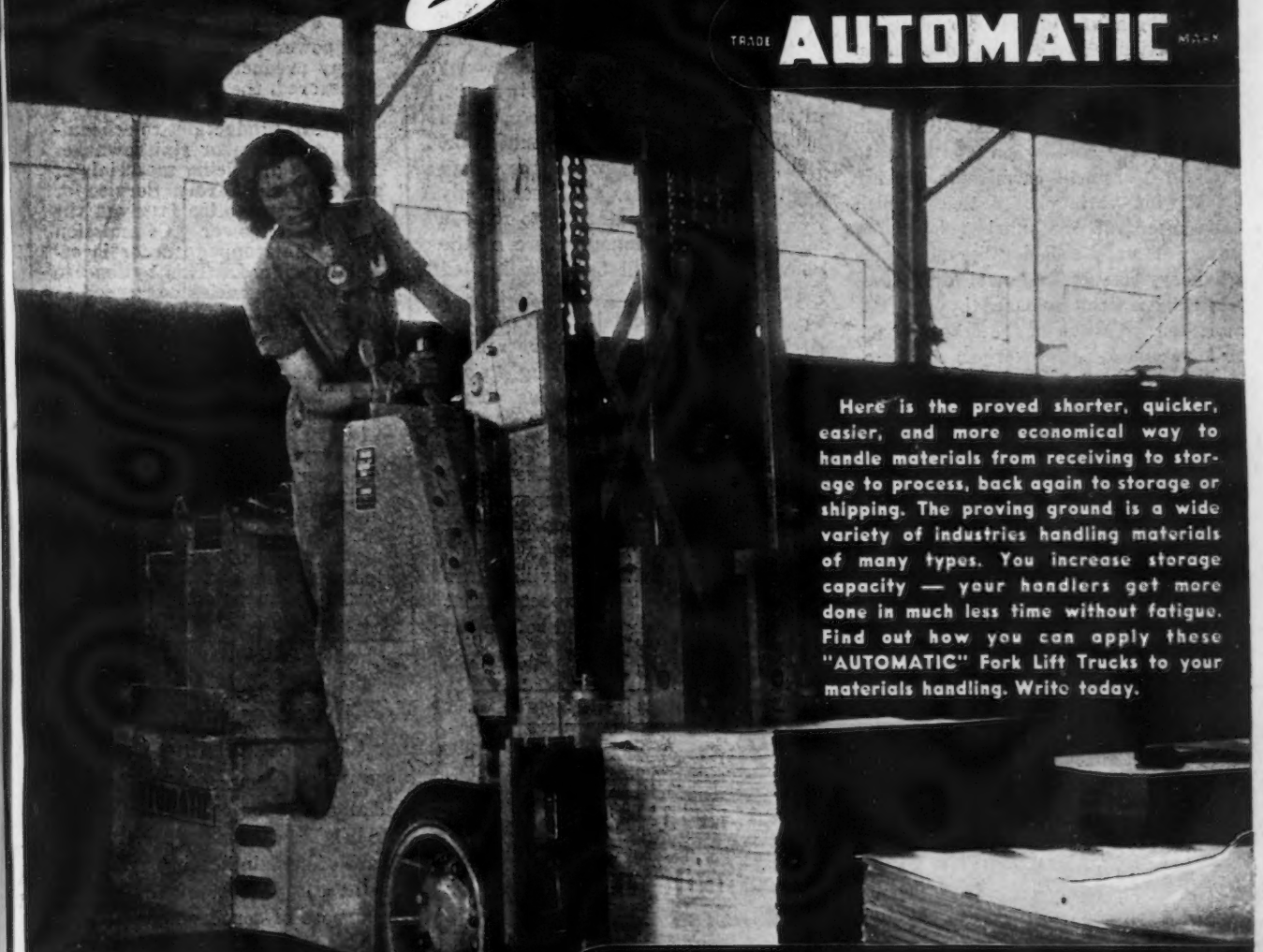
*Company*_____

*Address*_____

EE-12

MATERIALS HANDLING *Short Cut*

TRADE **AUTOMATIC** MARK



Here is the proved shorter, quicker, easier, and more economical way to handle materials from receiving to storage to process, back again to storage or shipping. The proving ground is a wide variety of industries handling materials of many types. You increase storage capacity — your handlers get more done in much less time without fatigue. Find out how you can apply these "AUTOMATIC" Fork Lift Trucks to your materials handling. Write today.

AUTOMATIC TRANSPORTATION COMPANY

Div. of the Yale & Towne Mfg. Co.

75 WEST 87th STREET · CHICAGO 20, ILLINOIS

MANUFACTURERS FOR OVER 35 YEARS

Electric Propelled INDUSTRIAL TRUCKS

These five trucks are used in a north-eastern Ohio steel plant for handling tin plate from sorting room to boxing department, from boxing department to warehouses, and from warehouses into cars. Loads range up to 5000 lb. and are 24" x 28" in size.

Canada Releasing Civilian Steel

Ottawa

• • • More steel is to be released for civilian manufacturers according to information released in government circles. After providing for all war requirements, it is stated that a surplus of steel is being established in this country and when available to civilian users will permit the making of a wide variety of articles which have been off the market for some time. Already considerable quantities of heavy structural steel and steel plate have been released by the Department of Munitions and Supply for non-war uses. However, as construction work requires other materials besides steel in which supply has not reached the surplus group, it is not likely that there will be much improvement in construction programs for the immediate future. It is expected, however, that steel sheets, soon will be made available in increasing volume for civilian manufacturing purposes.

Officials of the Wartime Prices and Trade Board stated that increased supplies of steel are to be made available for civilian production. Among the articles in which production will be resumed or stepped up are baby carriages, steel office equipment, kitchen utensils, nails, fences, farm equipment and building materials. Officials stated that while there had been improvement in the steel supply situation it is not sufficient to remove all controls, and manufacture of the above products will be on a limited scale.

From sources outside government circles, it is learned that some refrigerator makers are preparing to resume production operations early next year. While it is denied that production of automobiles is planned, it is believed that automotive plants in Canada are gradually tapering off in war materials production and that as war capacity becomes available, there will be a swing to civilian cars and trucks, and it is expected that production will be resumed before the end of 1944.

Labor to Guide Army Cancellations

• • • Careful consideration of manpower problems involved in Army production retrenchments is assured, the War Department states.

In all production re-scheduling, cut-backs or shutdowns of facilities producing materials of war for the Army Service or Air Forces, notice is given the War Manpower Commission when the stoppage order is officially signed. This is done to enable all agencies concerned to work with the employer to determine the number and types of workers to be released and on what date and to facilitate arrangements for the reemployment of the displaced workers in other essential industry.

Every effort is made to arrive at determination of production changes far enough in advance of the actual cut-back or shift to give sufficient time for the manpower and material problems to be worked out as smoothly as possible.

Strength you can rely on
in "SAE 1035's heat treated"
... by Cleveland ("C")
... by The Kaufman Process
Cleveland Brand hexagon head cap screws made from SAE 1035 steel, heat treated, are worthy of your investigation. Much stronger than ordinary screws, they cost no more—in all popular sizes, fine or coarse thread.
THE CLEVELAND CAP SCREW CO.
2917 East 79th Street • Cleveland, Ohio
Cleveland Cap Screws
Set Screws and Special Upset Parts
Made by the Originators of the Kaufman Process for Greater Strength and Accuracy
Specialists for 26 years in Headed and Threaded Products
WAREHOUSES
CHICAGO: 726 W. Washington Blvd.
PHILADELPHIA . . 12th & Olive Sts.
NEW YORK. . . . . 47 Murray St.
LOS ANGELES . . . 1015 E. 16th St.

WPB Releases Material For Certain Heating Controls

• • • WPB announced Dec. 4 that a special allotment of controlled materials has been provided for the manufacture of certain heating system controls at the request of the OCR for the purpose of conserving fuels.

Materials were provided for the manufacture of barometric dampers and control sets composed of outside-inside thermostats, motors, linkages, valves, relays and transformers. WPB's Plumbing and Heating Division will allocate the supplemental, controlled materials to all manufacturers who are able to produce the specified types of heating system controls.

Manufacturers are free to distribute and sell the above listed heating system controls without a priority rating if they are built of Fuel Conservation Drive Controlled Materials, since they are listed on Schedule A of Order L-79.

A manufacturer desiring to produce equipment other than shown above should not file an application under this Fuel Conservation Drive program. The Fuel Conservation Drive carries its own amount of controlled materials, separate and distinct from the regular quarterly CMP-4B applications.

Specify DINGS LIFTING MAGNETS ...for maximum P.L.H.

LIFTING CAPACITIES IN POUNDS

Type of Material	SIZE OF MAGNET						
	18"	24"	29"	39"	45"	55"	65"
Slabs	3500	7000	13000	20000	38000	50000	65000
Skull cracker balls	3000	6000	11000	18000	24000	30000	40000
One ingot	3000	4000	6000	8000	10000	15000	30000
Machine cast pig iron	200	300	500	900	1600	2500	3500
Heavy melting scrap	200	300	500	900	1600	2500	3500
Sand cast pig	140	250	380	700	1350	2100	2900
Boiler plate scrap	130	250	500	700	1150	1500	2250
Punching scrap	150	250	350	600	800	1200	1600
Broken scrap	120	210	360	600	1100	1400	1800
Cast iron borings	110	200	350	600	1100	1500	2200
Steel turnings	50	100	200	300	450	800	1200

Built to give you more P.L.H. POUND LIFTING HOURS

DINGS *High Intensity* Lifting Magnets for fast, economical metal handling offer you features designed to provide maximum *pound lifting hours,* the measure of the length of time a magnet will maintain its maximum lifting capacity. A large coil with the correct proportion between copper wire and core steel insures high magnetic efficiency. The coil is securely anchored in place and impregnated with waterproofing compound to minimize chances of short circuits or coil failure. The body is rugged with radiating fins to aid in dissipation of heat which would weaken the magnetic pull. The bottom plate is made of special alloy steel to resist hard usage.

The Dings Lifting Magnet is designed by the world's largest exclusive builders of magnetic equipment to live up to the Dings reputation for high quality equipment. Catalog available on request.

DINGS MAGNETIC SEPARATOR CO.

516 E. Smith St., Milwaukee 7, Wis. Established 1899

Dings MAGNETIC SEPARATION HIGH INTENSITY

NEW, FREE MANUAL

Tells How to Solve Such Cleaning Problems as

Removing oxide film, light rust from steel parts

De-tarnishing brass and copper

Removing oxide and heat treat films from aluminum

Cleaning before Alrok Finishing

Stripping anodizing film from aluminum work racks and rejects

THIS NEW, FREE, 12-page Oakite instruction manual describes how a newly developed, versatile material . . . OAKITE COMPOUND No. 84 . . . QUICKLY, THOROUGHLY, SAFELY removes oxide and heat treat films, light rust deposits, soldering fluxes and similar accumulations from a wide variety of iron, steel, aluminum, brass and copper war supply items.

Send for YOUR Copy!

You will find in its pages plant-tested techniques that will help you facilitate and speed-up your production of war materiel. Also included are directions for using Oakite Compound No. 84. Every production superintendent and engineer should have a copy of this new manual for use and reference, mailed FREE on request.

OAKITE PRODUCTS, INC.
34H Thomas St., New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized cleaning*
Buy Bonds for Victory
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Among the Week's Trade Notes

Grand Rapids Castings Co., Grand Rapids, Mich., has been formed recently. The company will erect a foundry for production of permanent mold aluminum castings. Donald G. Denison is president.

•

Meehanite Metal Corp., New York, announces the granting of manufacturing rights for meehanite castings to the Indian Hume Pipe Co., Wadala, India.

•

Pennsylvania Salt Mfg. Co.'s new Whitemarsh Research Laboratories are located about ten miles from the center of Philadelphia instead of near Harrisburg, Pa., as reported in the Nov. 4 issue of The Iron Age.

•

Standard Home Products Co., Inc., Westfield, Mass., has acquired from the H. B. Smith Co. 8½ acres of land adjoining its property. The company has plans for post-war expansion, involving a two-story manufacturing plant.

•

Waterbury Clock Co., Waterbury, Conn., after Jan. 1 will be known as the United States Time Corp.

•

Colonial Broach Co., Detroit, announces opening of offices at Dayton and in Cleveland. The Dayton office is located at 710 Harries Building with H. E. Roedter as district manager while George Pierce is district manager for the Cleveland area, with offices in the Penton Building.

•

Wade Mfg. Co. and **Woodruff & Edwards, Inc.**, have combined. The new company will be known as the Wade Mfg. Co., Div. of Woodruff & Edwards, Inc., with main offices and plant at Elgin, Ill.

•

Greene, Tweed & Co., New York, has purchased the Asbestos Fibre Spinning Co., North Wales, Pa.

•

Richmond Radiator Co., Uniontown, Pa., subsidiary of the Reynolds Metal Co., has acquired the United States Sanitary Mfg. Co., Monaca, Pa. The new plant will be under the supervision of E. L. Hibler, who has been associated with United States Sanitary for 10 years, and prior to that, was superintendent of Richmond's Uniontown enamel plant.

•

B. F. Goodrich Co. will build a new tire manufacturing plant in Miami, Florida.

•

Michigan Tool Co., Detroit, has opened a factory service and sales district office at 1506 Toledo Trust Building, Toledo 4, Ohio. The new office will be in charge of M. E. Teague and W. F. Haverstock, according to P. F. Zerkle, sales manager of the company.

New WPB Forms

WPB-1796—Request for assistance in expediting delivery of critical materials and components for automotive equipment.
WPB-3159—Ingot maker's monthly report copper-base alloy ingot operations.
WPB-2959—Application for copper, copper-base alloy ingot and scrap: For ingot makers, users of copper for alloying purposes, chemical plants, electro-typers, jobber dealers and other miscellaneous processors.
WPB-1685—Electrical indicating instruments: Supplier's monthly operations report.
WPB-452—Copper and copper-base alloy scrap generator report. Monthly.
WPB-689—Chromium: Statement of stocks, consumption and request for allocation.
WPB-547—Distributors' application for preference rating.
WPB-3159—Ingot maker's monthly report copper-base alloy ingot operations.
WPB-452—Copper and copper-base alloy scrap generator report. Monthly.
WPB-2039—Fluorspar: Producers' quarterly report of mine ore reserves and estimated future production of mine and mill.
WPB-1122—Beryllium: Consumers' monthly application for allocation.
WPB-1123—Beryllium: Monthly report of inventory, consumption, production and request for authorization to use.
WPB-1097—Customer's application for allocation of tantalum for delivery during the month.
WPB-165—Application for authorization to enter into tool processing agreement for aluminum or magnesium. (To be submitted by owner of material)
WPB-2923—Natural corundum primary grain: Consumer's monthly report of stocks, receipts and consumption.
WPB-2638—Ferrocerium: Producer's quarterly report of operations.
WPB-878—Internal combustion engines except aircraft propulsion. Manufacturers monthly report: Production, orders and shipments.
WPB-2869—Tungsten: Report of consumption and request for allocation pursuant to Order M-29 as amended. Monthly.
WPB-1212—Metal mines: Application for serial number pursuant to Preference Rating Order No. P-56.
WPB-2952—Core or churn drills: Application for serial number pursuant to Preference Rating Order P-56.
WPB-2784—Coal mines: Application for mine serial number pursuant to Preference Rating Order P-56.
WPB-2758—Non-metallic mines: Application for mine serial number pursuant to Preference Rating Order P-56.
WPB-829—Indian kyanite (crude and calcined) and Indian sillimanite: Monthly report of stocks, receipts and consumption.
CMP-9—Application for allotment of aluminum forgings, pressings, or impact extrusions.
WPB-3362—Manufacturers basic data form: For allocation or scheduling of aircraft components.
WPB-2613—First quarter 1944 application for priorities assistance to obtain production materials under Priorities Regulation 11B.
CMP-9—Application for allotment of aluminum forgings, pressings, or impact extrusions.
WPB-3362—Manufacturers basic data form: For allocation or scheduling of aircraft components.

•

Court Backs ICC Ruling in Hanna Case

Buffalo

• • • **Payment of allowances** to Hanna Furnace Corp., Buffalo, by 10 railroads for switching performed by the firm within its plant must be discontinued according to a majority opinion filed by the U. S. Circuit Court, sustaining an Interstate Commerce Commission order prohibiting the payments. Two judges signed the opinion while the third dissented.

The corporation had asked for a judgment setting aside the ICC order of Nov. 11, 1942, which ordered the railroads to stop the practice of payments, permanently enjoining enforcement of the order, and cancelling tariffs filed by the railroads in compliance with the commission's order, in which allowances were not provided.

For Fast, Accurate Multi-Stage Forging ....

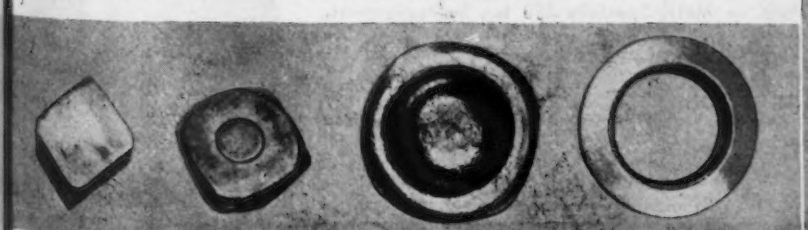
AJAX HIGH-SPEED FORGING PRESSES

1600 ton Ajax Forging Press in operation.

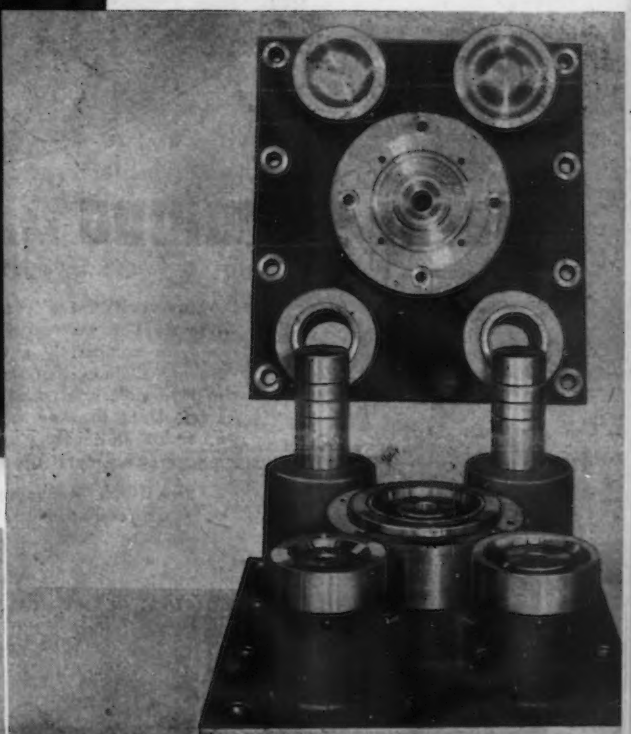
Pictured at the left is a typical forge shop installation of an Ajax Solid Frame Forging Press. Ring gears are being forged in one heat in three progressive operations shown below with dies and bolsters illustrated to the right.

These and other types of multi-stage forgings are forged to close tolerances economically in Ajax Presses at high rates of production. The Ajax Air Clutch for speedy operation, the exclusive rear extension guided ram with great overall guided length for accurate alignment of dies and for resisting off-center pressures of multi-stage forging, and the massive solid steel frame for maximum rigidity, all contribute to the production of accurate forgings, speedily and economically.

Write for Bulletin No. 75



The original billet and the three progressive stages in forging an automobile differential ring gear blank.



Dies and bolsters for forging a ring gear blan

THE AJAX MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND, OHIO

621 MARQUETTE BUILDING • CHICAGO, ILLINOIS

METAL STAMPING *that meets* EXACTING REQUIREMENTS

A completely equipped plant for PLASTIC INJECTION MOLDING from a fraction of an ounce up through 18 oz. per shot.

Applying its many years of experience in the production of fine metal stampings to the manufacture of War Materiel, The Metal Specialty Company is completely equipped to give you efficient service in Stamping, Rolling, Coining, Forming, Drawing and Annealing in all Metals. Specialists in Hydraulic cold drawing and embossing in all metals including stainless steel. Deep drawing and embossing up to 850 tons capacity. Shells drawn up to 20" in depth. Assembling including Flash and Resistance Seam Welding. Pressed metal products to specification.

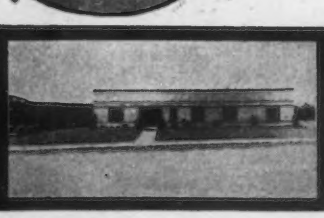
OPERATION: Reducing and Ironing Shells. Four each press stroke, each operator feeding two shells on Metal Specialty 850 ton hydraulic press.

MAIN OFFICE—PLANT
Este Avenue, Cincinnati 32, Ohio

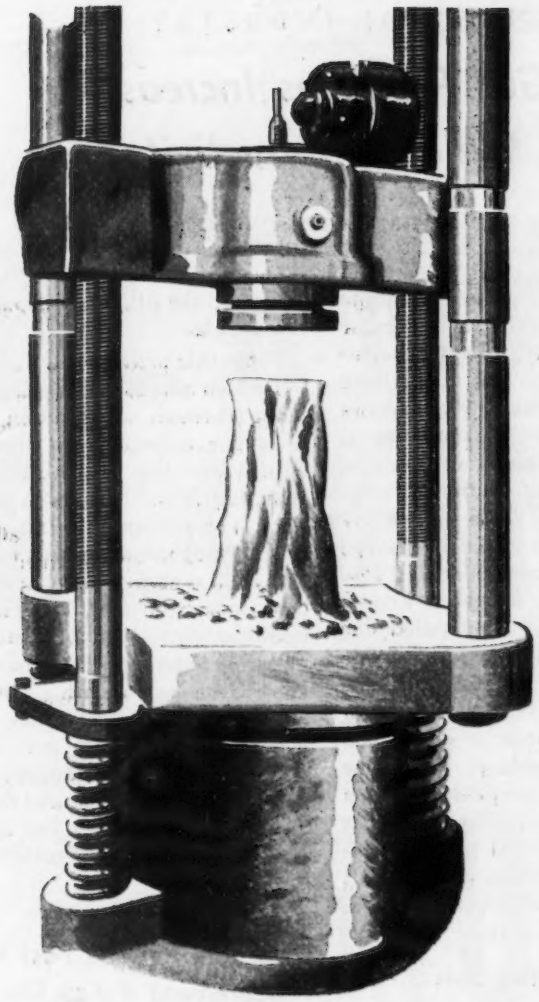
BRANCH PLANT—SALES OFFICE
S. L Street, Richmond, Indiana

SALES OFFICE
West Grand Blvd., Detroit, Michigan

A completely equipped plant to render you complete service in the fabrication of all METAL PARTS.



The
METAL SPECIALTY *Co.*
MAIN OFFICE AND PLANT • ESTE AVENUE • CINCINNATI, OHIO



THE "BLOCK BUSTER" MACHINE

and what Hele-Shaw Fluid Power had to do with it—

Not so long ago, machines for breaking test blocks of concrete, wood and other materials were essentially weighing devices, mechanically operated.

Someone conceived the idea of using hydraulic rams for exerting the tremendous pull or push required. The first rams were pumped by hand, but during the natural course of improvement, our engineers were approached for suggestions. They recommended a Hele-Shaw Pump and controls.

Several important advantages were gained. The Hele-Shaw Pump, being a rotary radial piston type, applied the power smoothly and continuously. Through comparatively simple controls, the rate of flow of the oil under pressure could be regulated to obtain quickly any desired rate of travel of the ram . . . and automatically maintain it.

With the oil fluid medium, the pump could be located at any convenient point, not necessarily on the testing machine. The test load could be read directly from hydraulic gauges.

Many types of hydraulic testing machines are now powered by the fluid muscles of Hele-Shaw Pumps. Possibly you, too, have a profitable application for Hele-Shaw Fluid Power in your post-war planning. If you *think* so, put your product or process, machine operation or control up to Hele-Shaw engineers.

THE **Hele-Shaw** Fluid Power Pump

AE CO 75th ANNIVERSARY

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE • PHILADELPHIA, PA.

designed for time saving

Quick-precision shimming with Laminum often cuts assembly time 20 to 30%. Is introduced without fuss ... also eases shop, maintenance and service routine.

Shims cut to your specifications. Stock shim materials obtainable from your dealer. Write us for further information and shim application chart.

Laminated Shim Company
Incorporated
76 Union Street • Glenbrook, Conn.

LAMINUM
THE SOLID SHIM THAT peels FOR ADJUSTMENT
2044

Gas Pipelines Increase Welder Productivity

(CONTINUED FROM PAGE 63)

gen pipelines are divided into units or sections, each serving a particular area. A waterseal protective device is introduced into the line at the head of each of these sections. Fig. 8 shows the waterseals serving the general welding area, mounted on an overhead platform with vents leading directly up through the roof. It is noteworthy that even here, floor space was saved by this platform arrangement. These waterseals serve as flashback arrestors in case of faulty combustion due to improper handling of torch or pressure regulator at the benches. The waterseals prevent flame propagation beyond the point of origin and also confine the effects of a pipeline disturbance to the particular section where it might occur. The system at Bell Aircraft is divided into six sections, any one of which can be shut down if necessary without disturbing the balance of the system.

Use of Bursting Disks

An additional safety device which is installed at numerous points throughout both the acetylene and the hydrogen gas lines is the bursting disk. Designed to rupture at 50 lb. pressure, these disks form the weak members of the system. They are positioned so that should any explosive wave form in the line it will find its way to the outside atmosphere by bursting the disk, thus protecting the pipeline and the building from damage.

All pipelines are of welded construction, painted with identifying colors for each gas. As further assurance against an operator's attaching his hose lines incorrectly, the regulator outlets at the benches are identified by large nameplates for each gas.

This method of gas distribution possesses another virtue in terms of safety, in that responsibility rests in the hands of only one man on each shift, instead of being divided among many. This single operator has complete charge of the control house, which means that he tends the acetylene generators, the hydrogen manifolds and the master pressure regulators for all three gases. He also takes care of deliveries of oxygen trailers and hydrogen cylinders, thus relieving the shipping department of these tasks.

From this brief account of the benefits which accrue in a typical aircraft plant through substitution of pipelines for cylinders, an idea can be gained of the practical value of changing from "buckets to plumbing." Most large plants in all industries are already so equipped, but heretofore such central control systems have been more generally associated with major industrial establishments using gases in hundreds of thousands of cubic feet per month. The results of this study show that factories which are relatively not large gas users can also effect appreciable savings in manhours, cost and floor space, depending more upon the number of cylinders used than total gas consumption.

Dr. Teele Resigns Post in Procurement Policy Division

Washington

• • • **Resignation** of Dr. Stanley F. Teele as deputy director of the WPB Procurement Policy Division was announced last week by Tudor Bowen, director of the division. Dr. Teele, a resident of Needham, Mass., will return to the Harvard Graduate School of Business Administration, where he is associate professor of marketing. As a member of the Inter-Agency Procurement Policy Board, he was actively engaged in work on policies relating to contract placement, contract termination and other phases of the war production programs.

Industry to Confer with WPB On Equal Distribution Order

Cleveland

• • • **Manufacturers and** wholesalers in Ohio, Kentucky, West Virginia, and western Pennsylvania are being invited to help shape a forthcoming equitable distribution order by the Cleveland Regional office of WPB. Interviewers from the Office of Civilian Requirements will be at the WPB in Cleveland on Dec. 16 and 17 to handle this matter.

OIL DERMATITIS ELIMINATED!

A Proven, Scientific Formula Makes

TOOLIFE CUTTING BASE

Actually Germicidal!

WRITE US FOR DESCRIPTIVE BOOKLET AND FURTHER DETAILS ABOUT HOW TOOLIFE CUTTING OILS CAN ELIMINATE PRODUCTION LOSSES DUE TO DERMATITIS.

SPECIALTY PRODUCTS COMPANY, INC.

190 WARREN STREET • JERSEY, CITY, N. J.

Manufacturers of Sulphur, Lard and Soluble Cutting Oils and Bases

Additional Territories Still Open to Sales Representative Write us at Once

PERSONALS

W. I. RODGERS, JR., assistant to chief engineer, Mack Mfg. Corp.

• **W. I. Rodgers, Jr.**, formerly assistant superintendent in charge of buses and shops, Board of Transportation, New York, has been appointed assistant to the chief engineer, Mack Mfg. Corp., New York.

• **Charles H. Reinert** has recently been appointed to the position of manager of operations of the steel and tube division of Republic Steel Corp., Mr. Reinert succeeds **Henry Wick** who has held the same position since 1932 and has resigned to become vice-president of Plastic Manufacturers, Inc., Stamford, Conn.

• **Arthur S. Brown** has been appointed sales manager of the Scott Aviation Corp., Lancaster, N. Y.

• **George M. Ebert** has been named director of finance of the Curtiss-Wright airplane division with headquarters at the Buffalo plant. Since 1942, he has been comptroller of the propeller division, Caldwell, N. J.

• **Harold J. MacDonald** and **Howard F. Johnson** of the wire and cable department of United States Rubber Co. have been assigned to new positions. Mr. MacDonald has been made manager of jobbing sales, and Mr. Johnson has been made manager of sales in New York.

• **E. R. Baxter**, of Carborundum Co., has been appointed assistant to the vice-president in charge of sales. **John F. Claydon**, formerly an industrial salesman has been made district sales manager at Boston, succeeding **Fred W. Bonacker. A. A. Murfey** has been appointed district sales manager at Cleveland.

• **Prof. William D. Ennis**, Humphreys Professor of Engineering Economics who is now with Stevens Institute of Technology will retire on March 1, 1944.

• **T. Oliver Morgan** has been appointed general manager of the home owners' catalogs division of F. W. Dodge Corp. and executive assistant to **Irving W. Hadsell**, vice-president in charge of the construction news division of the corporation.

• **Wallace F. Bowman**, former plant auditor and office manager of the Clarksville, Tenn., factory of B. F. Goodrich Co., has been appointed departmental auditor in Akron.

CHARLES H. REINERT, manager of operations, steel and tubes division, Republic Steel Corp., Cleveland, Ohio.

• **Dr. Richard F. Miller** has been appointed development engineer in stainless and alloy steels by Carnegie-Illinois Steel Corp., Pittsburgh, in the department of technology and research. Dr. Miller was formerly associated with U. S. Steel Corp.'s research laboratory.

• **Richard E. Palmer** of Niagara Falls, N. Y., has been named director of manpower utilization for the Niagara frontier division of Bell Aircraft Corp., Buffalo.

• **George E. Geyer** and **A. G. Hendrickson** of the welding division, Harnischfeger Corp., Milwaukee, have been appointed sales representatives in the Milwaukee area.

• **R. G. Adair**, assistant director of personal relations, of American Rolling Mill Co., will serve on the staff of the industrial members of the War Labor Board, Washington.

• **Harry Weaver** has been appointed foundry engineer for the Brillion Iron Works, Inc., Brillion, Wis. Prior to joining Brillion, Mr. Weaver was for five years foundry engineer for the Caterpillar Tractor Co., Peoria, Ill.

• **Henry M. Richardson**, chief engineer of plastic division, General Eelectric Co., Pittsfield, Mass., has resigned to enter private practice. **Frank W. Warner** succeeds him. He joined the General Electric Co. in 1930.

• **John T. Kiley** has been appointed regional salvage manager of the WPB with headquarters in Boston. He succeeds **John D. Orr**, recently inducted into the army. Mr. Kiley has been head of the industrial salvage section for New England.

• **Edwin E. Davis** has been appointed assistant manager of orders of the Jones & Laughlin Steel Corp., Pittsburgh. He has been with the company since 1919 at their Aliquippa Works. In June, 1942, he was transferred to the order department in the general office at Pittsburgh.

WILLIAM R. MOORE, vice-president, Norton Co., Worcester, Mass.

• **Frank Sanderson MacGregor** has been appointed general manager of the electrochemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del. He succeeds **Dr. E. A. Rykenboer** who is retiring because of ill health.

• **Robert Brown** of Ace Drill Corp., Detroit, has been appointed sales manager covering the eastern states.

• **J. B. Jeffress, Jr.**, formerly secretary and treasurer of Continental Can Co. Inc., New York, has been made a vice-president of the company. **Sherlock McKewen** was elected secretary and treasurer, and **W. H. Funderburg** was given full charge of the company's sales.

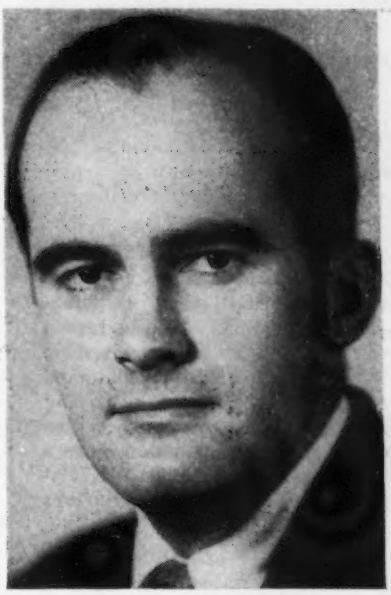
• **Thomas F. Scannell** has been made general sales manager of the Falk Corp., Milwaukee. Prior to his new appointment, Mr. Scannell was sales manager for all Falk products with the exception of those under the foundry division.

• **Dudley L. O'Brien** of American Car & Foundry Co., New York, has been appointed district sales manager of the Cleveland office succeeding **R. A. Williams** who has transferred to the New York general offices. Also **A. G. Woods** has been made district sales manager of the Washington office. Mr. Woods was formerly sales agent at the Chicago offices.

DUDLEY L. O'BRIEN, district sales manager at Cleveland, American Car & Foundry Co., New York.

• **Ward M. Canaday**, widely known automobile executive whose name is closely associated with the development of the "Jeep," has been elected president of Willys-Overland Motors. He joined the Willys-Overland Co. twenty-seven years ago in 1916, and in 1936 following Mr. Willys' death he brought about the successful reorganization of the company, becoming chairman of the board.

• **William Butler, 3rd**, has been promoted to advertising manager of Lukens Steel Co., Coatesville, Pa., and its subsidiaries. Mr. Butler succeeds **George M. Gillen**, who recently was named assistant manager of combined sales for Lukens and its subsidiaries.



WILLIAM BUTLER, 3rd, advertising manager, Lukens Steel Co., Coatesville, Pa.

• **Otto E. Zahn** has been appointed assistant works manager of American Foundry Equipment Co., Mishawaka, Ind., with general supervision over all manufacturing operations. Since joining the company in 1937 as industrial engineer, he has successively held the positions of development engineer and acting general superintendent.

• **Arthur F. Noyes** has been named truck tire manager for the Pacific coast area of B. F. Goodrich Co., Los Angeles. Succeeding Mr. Noyes on the Akron, Ohio, staff is **L. H. Taylor**, formerly assistant manager of the company's tire service department. **H. J. Poole**, truck and bus tire representative in Jacksonville, Fla., district will assume this post.

RALPH G. CAULLEY, director of purchases, Fruehauf Trailer Co., Detroit.

• **G. J. Stegemerten**, staff supervisor of industrial methods engineering for Westinghouse Electric and Mfg. Co., East Pittsburgh, was recently appointed expert consultant to the Secretary of War.

OBITUARY...

• **Howard Parker Fairfield**, professor-emeritus of machine construction at the Worcester Polytechnic Institute. Mass., died Dec. 2. He was 85 years old.

• **Theodore W. Monroe**, president of the Hartford Electric Steel Co., Hartford, Conn., and Roxbury Steel Casting Co., died Nov. 30.

• **William H. Kirkpatrick**, for many years New England sales manager of the American Can Co., died Dec. 2. He was born in London 57 years ago.

• **Charles Hamilton Scott**, electrical engineer of General Electric Co., Lynn, Mass., died Dec. 2.

• **W. C. Williamson**, president and founder of the Williamson Heater Co. of Cincinnati, died on Nov. 26. He was 84 years old and had been with the firm since 1890.

• **Glen Holt, Sr.**, vice-president of the Perfex Corp., Milwaukee, was killed in a hunting accident near Long Lake. Wis., Nov. 26. He was 47 years old.

• **Frank A. Hoster**, Philadelphia branch manager for the Snap-On Tool Corp., Kenosha, Wis., died Nov. 29 at his home.

MACHINE TOOLS

. . . News and Market Activities

Sales of Special Machines Predominant

Cleveland

• • • **Special purpose machine** tools make up the bulk of new business, as practically all new requirements for standard equipment are being met from excess stocks of machine tools throughout the country. Likewise, sales of induction heating equipment are holding up. Small tools, cutters, forming tools and similar items continue to form a major item in machine tool builders' sales, with deliveries improving tremendously during the past few months.

There is a subtle change occurring in American industry that is worthy of considerable note. Undoubtedly this change is the result of requirements of the aircraft industry. For the past several years aircraft and aircraft parts builders have been insisting more and more on machines that operate with greater precision and produce finer finishes. This influence is making itself felt elsewhere in industry.

As a result, the demand for highly precise machines and specialized lapping machines is holding up considerably better than the demand for standard equipment. Furthermore, it is not only the aircraft industry that is buying such equipment. Aircraft finishes are a "must" on many of the parts that are going into other types of armament. What normally was satisfactory if machined and ground, now is being lapped and the finish is being specified in microinches.

•

Renegotiators Reported Cleaning Up Tool Contracts

Cincinnati

• • • **While nothing has** definitely been announced, machine tool manufacturers indicate that Renegotiation Boards are attempting to clean up most machine tool contracts at the present time. Conferences, with the avowed intention of reaching conclusions, are being conducted in the Cincinnati area. Management continues to discuss the question of contract termination which continues to be a troublesome matter, but no conclusion on this problem has yet been announced.

Labor difficulties continue to pop up in a number of plants in town, including a few machine tool plants. Elsewhere in the district, manufacturers of other articles than machine tools are experiencing similar difficulties. Whether these labor difficulties are the result of a slackening in war boom, is difficult to ascertain, but they are coincident with plant reductions to accommodate decreased business. Machine tool manufacturers indicate a continued modest flow of orders. Backlogs are being reduced rapidly.

Machine Tool Shipments Decline in October

• • • **Monthly machine tool shipments declined nearly nine per cent in October according to the Tools Division of WPB.**

Shipments totaled $78,300,000 in October, or 8.8 per cent less than the September shipment value of $85,842,000, the report said. Total orders received in October were $34,900,000 and cancellations $4,100,000 leaving a total of net orders received of $30,800,000. Net new orders in September totaled $31,759,000. September cancellations were $5,800,000.

The backlog of unfilled orders in October totaled $286,600,000, compared with a September backlog of $333,119,000.

•

Coordinated Production Eyed for British, U. S. Tools

• • • **Machine tool production** with a view to combined planning was considered by the Machine Tool Committee of the Combined Production and Resources Board, formed in October and consisting of one member each from the United States, the United Kingdom, and Canada. Ralph E. Flanders, president of Jones & Lamson Machine Co., Springfield, Vt., is chairman of the committee. Sir Percy Mills, machine tools controller for the United Kingdom, and Sydney D. Pierce, the representative in Washington of the Canadian machine tools controller, are the other committee members.

The committee studied the surplus manufacturing capacity and the possibilities of best utilizing existing machine tools to insure their most effective use in war production. Problems concerning the disposition of postwar surpluses were also examined, and it was agreed that such an important subject should be scheduled for later study with all interested agencies concerned.

The curtailment of machine tool production in the United Kingdom in 1944, in order to divert additional labor and facilities to other essential war production, may result in additional requirements for machine tools from the United States. However, requirements of this nature cannot be forecast in detail at present. In all probability the bulk of these requirements will be drawn from excess stocks that are now held by the services in warehouses throughout the country.

•

Task Group Suggested On Tool Redistribution

• • • **Appointment of a task** group from the industry to formulate a broad policy for the redistribution of surplus machine tools after the war, was recommended at a meeting of the Machine Tools Industry Advisory Committee with WPB representatives in Washington.

Possible simplification of Preference Order E-1-b, **which** governs allocation to purchasers of the monthly production of machine tools and provides a sequence of deliveries, was proposed by WPB. It was suggested that quotas under the order may no longer be necessary and that reporting of order boards might be eliminated. It was pointed out that proposed changes in Order E-1-b would be subject to the approval of other government agencies concerned.

SLOW SPEED PRECISELY CONTROLLED...*always!*

with a 2-Speed R & M Hoist

R & M HOIST doing a precision material handling job . . . in this case, closing a mold.

90% of All Precision, Slow-Speed Material Handling Can Be Done with 4 to 6 Feet Per Minute Speed. Thus "So-Called" Multiple Speed Hoists Can Be Largely Supplanted by the Efficiency of R & M 2-Speed Hoist.

Two-speed R & M hoists now speed production and save man power in scores of foundries, aircraft, machine tool and machine shop plants. A precise, always uniform slow speed of from 4 to 6 feet per minute, regardless of load or current variation, is the secret of their success. Even the most inexperienced workman can use this slow speed easily and with safety. And usually with a great saving in time.

How R & M Efficiency Is Achieved

A simple, two-winding squirrel-cage motor is used with synchronous speeds of 360-1800, 360-1200, or 600-1200 r.p.m. The slow speed of the hook will always be approximately ⅕, ⅓, or ½ of the high speed. These values remain unchanged regardless of variables: full load or empty load; voltage up or down; operator skilled or otherwise. The slow speed is fixed, and uniform. The operator presses the button and knows exactly what will happen. He "fishes" for nothing.

PHOTOGRAPHIC PROOF

Load is lowered, touching bulb, with R & M push button two-speed control.

Load marks on bulb show accuracy of R & M push button two-speed control.

Ask an R & M representative to demonstrate how R & M hoists can bring you precise, productive speed control. Send the coupon, NOW. Or if you prefer ask us to send our new bulletin W815-IA.

SEND COUPON TODAY... FOR VALUABLE INFORMATION

ROBBINS & MYERS, INC.
Hoist & Crane Division, Springfield, Ohio.

☐ Please send me new R & M 2-Speed Hoist Bulletin No. W815-IA.

☐ Please have an R & M Hoist & Crane expert call on me.

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ROBBINS & MYERS • Inc.

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MOTORS • MACHINE DRIVES • FANS • MOYNO PUMPS • FOUNDED 1878

NON-FERROUS METALS

. . . News and Market Activities

Non-Ferrous Metals Lead Redistribution

• • • **Of the $73,092,000 worth** of serviceable surplus property redistributed between July 1 and Sept. 30, by far the most valuable item was non-ferrous metals, whose surplus consisted of 299,280 tons, valued at $49,386,000. Ranking second was ferrous metal, whose surplus was 598,100 tons, valued at $8,199,000.

The War Department said that less than 14 per cent or about $10,000,000 of the total surplus redistributed found its way into non-governmental channels and that of this quantity the major portion was bought by manufacturers working on contracts for the armed services. It was pointed out that property sold or otherwise disposed of by the War Department consists of materials and equipment which, because of rapidly changing war requirements, are found to be no longer of service.

Technical services of the War Department took $42,000,000 or nearly 58 per cent of the surplus property distributed. The Navy and other Federal agencies acquired property valued at about $21,000,000, or nearly 29 per cent.

o o o

Treasury Silver Available

• • • **Treasury silver made** available to essential industry under the Green Act is being purchased in substantial volume for the production of engine bearings, brazing alloys and solders, and "official articles," it was disclosed at the first joint meeting of the Silver Producers and Distributers Industry Advisory Committee. Purchase authorizations totaling some 25,000,000 oz. have been issued to date by WPB.

All foreign silver currently imported is in the form of ores and concentrates, which must be refined in this country. These imports are barely in balance with the demands of those industries permitted to use them. Newly mined domestic silver is also in close balance with permitted-use demand.

Several producers believed that domestic silver production may be somewhat less in 1944 than in the current year.

•

Antimony Allocations Halved

• • • **Antimony will be** released from allocation after Jan. 1, WPB said last week with the issuance of General Preference Order M-112, as amended.

The amended order provides that deliveries of antimony from persons other than Metals Reserve Co. may be made or accepted by any person without specific authorization from the WPB.

Reports will still be required, however, in order to permit the board to observe the position of the metal. But these reports will be on a quarterly basis rather than on a monthly basis as required under the original order.

•

Bolivian Tin Imports

• • • **Imports of Bolivian tin** concentrates have remained fairly level in 1943 as compared with the previous year. About one-half of the tonnage received came from the Patino mines. For the first ten months of 1943, 33,195 metric tons of tin content were imported, 16,743 tons coming from Patino. For the same period last year, 32,287 metric tons were received of which 15,837 tons were from Patino mines.

Details of the recommendation of the committee sent to Bolivia early this year to investigate labor conditions have recently been published. These include a wage-fixing system, a limitation of working hours to 48 a week for men and 40 hr. for women and children, and a reform of workers' insurance.

Existing minimum wage rates for undertakings not possessing a grocery store are: In commerce and industry clerks receive 305.76 bolivianos monthly, adult workers 11.31 bolivianos a day. In gold, tin and wolfram mines clerks get 305.76 bolivianos monthly, adult workers outside the mine 13 bolivianos a day and in the mine 15.60 bolivianos. In other mines, the rate for clerks is 270.48 bolivianos a month, adult workers outside the mine 11.50 bolivianos a day and in the mine 13.80 bolivianos a day. (One boliviano is equal to approximately $0.24.) Where grocery stores exist the rates are proportionately lower as they are for women and children.

•

Ceilings Set for Antimony

Washington

• • • **Extending further** its policy of simplifying schedules, OPA recently set a base ceiling price of 14½c. a pound on antimony metal, 99 to 99.8 per cent, by translating existing "freeze date" ceiling prices into dollars and cents. The level is for carlot sales by any seller and is the maximum delivered price plus carload freight from Laredo, Texas, to the buyer's receiving point. This leaves undisturbed the customary practice of selling on the basis of Laredo, the location of the largest domestic producer.

OPA also moved 15 antimony compounds to the new regulation from GMPR.

Simultaneous with issuance of this new price schedule, WPB announced that antimony will be released from allocation after Jan. 1. This action was taken through General Preference Order M-112, as amended. The amended order provides that deliveries of antimony from persons other than the Metals Reserve Co. may be made or accepted by any person without specific authorization from WPB.

Reports will still be required, however, in order to permit the board to observe the position of the metal. But these reports will be on a quarterly basis, rather than on a monthly basis as required under the original order.

•

Scrap Sells below Ceiling

• • • **Group 1 and 2 copper** and bronze scrap are commanding full ceilings and full premiums with demand for these items greater than supply. Group 3 items are currently not in too great demand and in many cases are selling at below ceiling prices.

Aluminum scrap is still in a very chaotic state and secondary smelters are offering to purchase this material at anywhere from three or more cents below the ceiling price.

Monel, nickel and nickel-chrome are not moving at all.

REFINER, SMELTER PRICES

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd	15.00
Aluminum, No. 12 Fdy., (No. 2)	13.50
Aluminum, deoxidizing grades	12.50 to 13.75
Antimony, Asiatic, New York	Nominal
Antimony, American, f.o.b. Laredo, Tex.	14.50
Arsenic, prime white, 99%	4.00
Brass, 85-5-5-5 ingots (No. 115)	12.25
Cadmium, del'd	90.00
Cobalt, 97-99% (dollars per lb.)	$2.11
Copper, electro, Conn. Valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Copper, beryllium, 3.75-4.25% Be; dollars per lb. contained Be	$15.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.5%, dollars per troy oz.	$10.00
Iridium, dollars per troy oz.	$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	21.50
Magnesium, 12-in. sticks, carlots	30.00
Mercury, dollars per 76-lb. flask, f.o.b. shipping point or port of entry	$191 to $193.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.87
Copper, H.R.	....	17.37	....
Copper, drawn	....	18.37	....
Low brass, 80%	....	20.10	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercal bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper: 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NON-FERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums)

Copper, Copper Base Alloys

OPA Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.90*
High lead bronze borings	10.50*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3

Yellow brass soft sheet clippings	8.62½
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	8.00
Old rolled brass	7.75
Admiralty condenser tubes	8.00
Muntz metal condenser tubes	7.50
Plated brass sheet, pipe reflectors	7.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[2]
Manganese bronze borings	5.50[2]

OPA Group 4

Automobile radiators	7.00

OPA Group 5

Refinery brass	5.00*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Aluminum

Plant scrap, segregated

2S solids	9.00
All other solids	8.50
Borings and turnings	
W'rt alloys (17S, 18S, 32S, 52S)	7.50
High grade alloys	7.00
Low grade alloys	6.50

Plant scrap, mixed

All solids	7.50
Borings and turnings	5.50

Obsolete scrap

Pure cable	9.00
Old sheet and utensils	7.50
Old castings and forgings	8.00
Pistons, free of struts	8.00
Pistons, with struts	6.00
Old alloy sheet	7.00

For old castings and forgings, pistons, sheets, add ½c. lb. for lots 1000 to 19,999 lb.; for other scrap add 1c.; for lots over 19,999 lb. add 1½c. a lb.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
Old zinc scrap	5.75
Unsweated zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25⅛
Electrolytic, full size	22⅞
cut to size	30⅛
Rolled, oval, straight, 15 in. and longer	23⅛
Curved	24¼
Brass: Cast, 82-20, elliptical, 15 in. and longer	23⅝
Zinc: Cast, 99.99, 16 in. and over	16¼
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00–13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots	40.82–41.125
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc, sulphate, 89% crystals, bbls.	6.80

SCRAP

OPA Alters Cast Scrap Structure

Washington

• • • **To facilitate the flow** of cast iron scrap to foundries without facilities for preparing the metal for melting furnace use, OPA announced last Friday that scrap dealers no longer will be required to absorb inbound rail transportation charges on heavy breakable cast scrap which has been allocated or which they have purchased in behalf of a foundry consumer.

Effective Dec. 14, a dealer buying heavy breakable cast scrap allocated by WPB or bought in behalf of a foundry may pass on to the buyer the rail transportation charges accruing for moving the material from its point of origin to his yard for preparation into No. 1 cupola cast scrap.

Formerly a dealer's maximum price for No. 1 cupola cast scrap under all circumstances was the OPA ceiling plus the transportation from his yard to the consumer's foundry. This price was applicable regardless of allocations or direct purchases of heavy breakable material by the consumer. This meant that the dealer was required to absorb inbound transportation costs to his yard. Since purchases of heavy breakable cast scrap on allocation are made at ceiling prices the differential of $2.50 per gross ton for preparing the heavy material into the smaller sizes required for cupola use was reduced by the amount of the inbound freight.

Absorption of inbound freight made the allocation of heavy breakable cast difficult and discouraged the purchase by consumers of supplies available in remote areas. The action, in effect, assures the dealer a preparation fee of $2.50 per gross ton for preparing heavy breakable cast into cupola cast where the dealer is required to pay the full OPA ceiling price.

The intransit preparation provisions, OPA said, may be applied on purchases of heavy breakable cast scrap originating in Montana, Idaho, Wyoming, Nevada, Utah, Arizona, New Mexico, North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida, even though the material is unallocated.

In all other states the intransit preparation privileges may not be exercised unless the scrap is allocated by WPB. This limitation, OPA explained, will encourage proper distribution of the available supply of cast iron scrap.

Assurance to dealers of the maximum $2.50 preparation where they are required to pay full ceiling prices for the unprepared material, OPA added, will offset to some extent any increases in preparation costs experienced during the past few months as well as stimulate the movement of heavy breakable cast from remote areas.

The action was taken in accordance with a recommendation of WPB and of OPA's Iron and Steel Scrap Industry Advisory Committee. The pricing change was made in Amendment 13 to Revised Price Schedule 4 (Iron and Steel Scrap) and became effective Dec. 14.

o o o

Salvage Unit Abandons Alloy Drive

Cleveland

• • • **In generally** reviewing the iron and steel scrap situation, H. B. Faust, director of the WPB Salvage Division, stated that alloy scrap is the biggest headache of the WPB salvage branch and all efforts in scrap collection for this material have been abandoned by the unit. He protested violently the editorial comment that claimed the latest scrap drive was a failure, claiming that scrap collections as a result of the drive were only just a fraction off from the collections of the drive last year.

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ST. LOUIS — Cutbacks on ordnance projects have helped to ease the scrap situation and inventories of district mills are said to be sufficient for operations through January. Foundry grades are still scarce.

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NEW YORK—Although little scrap is moving, three eastern Pennsylvania mills are limiting shipments of open hearth grades. One has placed a complete embargo on scrap. Blast furnace grades are still wanted, however.

•

CHICAGO—Mill stocks are achieving better balance by virtue of certain mills remaining out of the market. There are some indications that yards are able to handle increased tonnages through improvement in the labor situation. Close attention is being given to possible curtailment in requirements through decrease in operations but no tangible signs have appeared in this regard.

•

BUFFALO—Bare ground was more in evidence this week as yard operators continued to scrape along. The district's biggest consumer received a lot of out-of-town scrap under allocation but was reported to have only three weeks of reserve stocks. In contrast, the No. 2 consumer has sufficient scrap for several months.

•

BIRMINGHAM—The Alabama Public Service Commission was scheduled Dec. 16 to hold a hearing at Montgomery to determine whether railroads shall allow a general intra-state tariff for light sheet scrap based on a 30,000-lb. minimum. The rates for this material vary at present from a 30,000-lb. minimum between some state points to an 80,000-lb. minimum between others. Scrap dealers contend that freight rates between some points carry such a heavy minimum car load that shipping of this light material between these points is prohibitive.

•

CINCINNATI—With some hints in the area of a cutback on war production, and rumors of a decline in demand for finished products, dealers report that mills are backing away from the market and that at the present time the demand for steel scrap has materially lessened. Interest in low phos scrap has similarly slackened up and consumers report that they do not wish to be caught with too large inventories in the event of acceleration of contract cancellations. Dealers generally estimate consumers' inventories to average approximately 45 to 60 days, although in a few isolated instances inventories of 90 days are on hand. Demand for cast grades, however, continues to be fairly active, with dealers indicating that many requests remain unfilled because of the scarcity of this type of material.

•

BOSTON—Brokers generally complain of their inability to obtain material from yards. Yards, on the other hand, say it is all they can do to fill regular customer orders in view of the dwindling supply of material and labor, and therefore are not looking for new outlets. They anticipate the quietest winter on record. American Rolling Mill has held up shipments to its Butler plant due to labor troubles. Expectations are 2000 tons of battlefield scrap will partly be offered in New England.

•

PITTSBURGH — Cold weather early this week has slowed up some deliveries, but year end inventory influences have nullified, to some extent, the effect of the weather. Otherwise, the market seems to be in good balance, except for alloy scrap, which is still glutting the market.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
							Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shoveling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.00	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

* Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK CITY or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Minimum set at $14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakmont, Cal. Claymont, Del., includes the switching point of Chester, Pa. Chicago includes Gary, Ind., switching district.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $3.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced—$2; 75 to 85% Fe—$4; under 75% Fe—$8 per ton. Mill scale of 65% or more Fe—$8 per ton. Mill cinder and grindings, shipping point maximum price of $4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Carton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.00	24.00	24.25	24.50
Chicago, Philadelphia Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

Tool Steel Scrap Ceiling Prices Set by MPR 379, May 4, 1943

	BASE PRICE SEGREGATED Solids, Lb. Cont. W	Turnings, Lb. Cont. W	BASE PRICE UNSEGREGATED SOLIDS	BASE PRICE UNSEGREGATED TURNINGS
Type 1	$1.80	$1.60	$1.50 per lb. contained W if 5% or more.	$1.30 per lb. contained W if 5% or more.
Type 2	1.60	1.40	$1.15 per lb. contained W if over 1% and less than 5%.	$1.00 per lb. contained W if 1% and less than 5%.
Type 3	1.25	1.25		
Type 4*	0.125	0.105	$0.80 per lb. contained Mo if 1½% or more.	$0.70 per lb. contained Mo if 1½% or more.
Type 5*	0.135	0.115		

*Per lb. of scrap material.

Comparison of Prices . . .

Advance Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Dec. 14, 1943	Dec. 7, 1943	Nov. 16, 1943	Dec. 15, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Dec. 14, 1943	Dec. 7, 1943	Nov. 16, 1943	Dec. 15, 1942
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.89	$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.50	$6.00
Foundry coke, prompt	7.50	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 145-157.

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22 issue.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Dec. 14, 1943	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.25513c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.26190c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.25513c.,	2.25513c.,	$23.61	$23.61	$19.17	$19.17
1942	2.26190c.,	2.26190c.,	23.61	23.61	19.17	19.17
1941	2.43078c.,	2.43078c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99696c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

. . . Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or qauntity extras apply. In many cases gage, width, mutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.12¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
.50 / .75 Electro tin plate, box	$4.50	$4.50	$4.50						$4.60						
	$4.65		$4.65						$4.75						
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.37¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢[13]	2.25¢	2.39¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢[13]	2.25¢		2.47¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont = 2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢.
Galvanized	add proper size extra and galvanized extra to bright wire base, above														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

[1] Mill run sheets are 10c per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 29,999 lb. [9] Carload lot in manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [12] Boxed. [13] Portland and Seattle price San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILING—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote $2.40, at established basing points. Calumet Steel division of Borg Warner may quote 2.35c., Chicago on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.35c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote shipment to Detroit area on Middletown base; Parkersburg Iron & Steel may quote $2.25 per hundred f.o.b. Parkersburg, W. Va. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points; Parkersburg Iron & Steel may quote $3.85 per hundred f.o.b. Parkersburg, W. Va. Apollo Steel Co. is permitted to charge $3.75 per 100 lbs. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote $2.35 established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMI-FINISHED STEEL: *Billets, Rerolling*—Connors Steel Co., $50.69; Keystone Steel & Wire Co. may charge $36.40 per gross ton f.o.b. Peoria, Ill.; Phoenix Iron Co. $41.00; Continental Steel Corp. may sell Acme Steel Co. at $34.00 plus extras and freight; Ford Motor Co. $34.00 f.o.b. Dearborn, Mich.; Northwestern Steel & Wire Co. on Lend-Lease, $41.00; Wheeling Steel Co. on Lend-Lease, $36.00 for small billets f.o.b. Portsmouth, Ohio; *Billets, Forging Quality*—Follansbee Steel Corp. $49.50 f.o.b. Toronto; Andrews Steel Co. $50.00 at basing points; Pheonix Iron Co. $47.00. *Slabs*—Andrews Steel Co. $41.00; Empire Sheet & Tin Plate Corp. $41.00; Pheonix Iron Co. $41.00, rerolling grade, $47.00, forging grade. *Blooms*—Phoenix Iron Co. $41.00 rerolling grade. $47.00 forging grade. *Sheet Bar*—Empire Sheet & Tin Plate Corp. $39.00 f.o.b. mill; Wheeling Steel Corp. on Lend-Lease $37.00 f.o.b. Portsmouth, Ohio. *Other Exceptions*—Laclede Steel Co. on Lend-Lease through eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendments to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-48 Ann.
Philadelphia	$3.518	$4.872[6]	$5.018a	$3.922	$4.772	$3.605	$3.666	$3.882	$4.072	....	$7.116	....	....
New York	3.590	4.613[3]	5.010	3.974[6]	4.774	3.768	3.758	3.853	4.103	$6.008	7.158	$7.303	$8.453
Boston	3.774	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.114	6.162	7.312	7.344	8.494
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	....	....	....	....
Washington	3.596	4.841	5.196[4]	4.041	4.741	3.796	3.930	3.941	4.041	....	....	....	....
Chicago	3.25	4.20	5.23	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.75	6.90	8.85	8.00
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.887	5.987	7.137	7.087	8.237
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.956	7.106	6.85	8.00
Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.75	5.75	6.90	6.85	8.00
Detroit	3.45	4.50	5.004	3.70	5.909[17]	3.609	3.661	3.45	3.80	6.08	7.23	7.159	8.309
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.611	3.691	3.611	4.011	....	....	....	....
St. Louis	3.397	4.247[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.031	6.131	7.281	7.231	8.381
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	7.15	6.85	8.25
St. Paul	3.51	4.46	5.257[4]	3.86	4.351[7]	3.813	3.813	3.763	4.361	6.09	7.24	7.561	8.711
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.443	....	....	....	....
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.53	3.98	6.08	7.23	7.18	8.33
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.857	4.66	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	3.95	4.95	5.25	4.20	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	3.763	5.573[3]	6.313[1]	4.313	....	4.25	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.203	6.104	4.95	5.613[15]	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.5514	7.304	6.354	4.5014	7.333[17]	4.6514	4.3514	4.1514	5.333	8.304	9.404	9.404	10.454
Seattle	4.6512	7.054	5.954	4.2512	....	4.7512	4.4512	4.3512	5.783	....	9.404	....	....
Portland	4.6511	6.604	5.754	4.7511	....	4.7511	4.4511	4.4511	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.5317	....	6.1718	5.5317	....	4.9817	4.9817	4.8817	5.90	....	....	....	....

NATIONAL EMERGENCY (N. E.) STEELS

(Hot Rolled Mill Extras for Alloy Content)

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	$25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.20/ .30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40	8.00		
NE 9260	.55/ .65	.70/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9261	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.10/ .25			.65	13.00		
NE 9262	.55/ .65	.70/1.00	.040	.040	1.80/2.20	.25/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9425	.23/ .28	.80/1.10	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.75	15.00	1.25	25.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.20/ .35	.30/ .50	.30/ .60	.08/ .15	.80	16.00	1.30	26.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9545*	.43/ .48	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00

*Recommended for large sections only. Note: The extras shown are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, $5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1999 lb.; strip, extras on all quantities; bars, 1500 to 39,999 lb.; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 to 39,999 lb. (15) 1000 to 39,999 lb. (16) 1500 to 39,999 lb. (17) 2000 to 39,999 lb. (18) 3500 to 39,999 lb.

(a) Philadelphia: Galvanized sheets, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Delivered prices do not reflect new three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Steel

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton 54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
13 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are $2.00 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

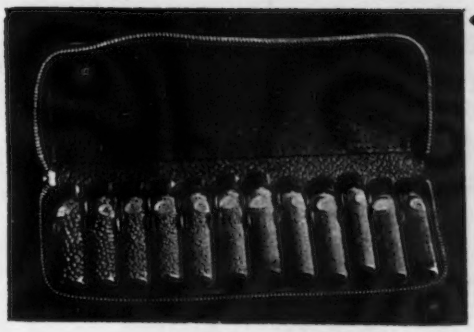
Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

PERFORATED METALS

INDUSTRIAL and ORNAMENTAL

To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

ANY METAL • ANY PERFORATION

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO 44, ILL.

Eastern Office, 114 Liberty Street, New York 6, N. Y.

MARK STEEL PLATES this Positive, Easy Way

Write with Paint

MARKAL DRIES HARD AND FAST

MARKAL PAINTSTIKS are ideal for layout work on bare or coated metal plates by shipyards, steel mills, steel fabricators, railroads, foundries, etc.

MARKAL PAINTSTIK marks dry instantaneously, permitting immediate handling of plates. Workers can walk on plates without effacing marks.

MARKS COME OFF IN PICKLING BATH OR WITH SOLVENTS

QUICK AND CLEAN—NO MESS, NO FUSS—ALWAYS READY FOR INSTANT USE

Choice of Colors

Write for Samples, Literature

A Specific Type MARKAL PAINTSTIK for Every Marking Job

MARKAL CO. 6-W EAST LAKE ST. CHICAGO 1, ILL.

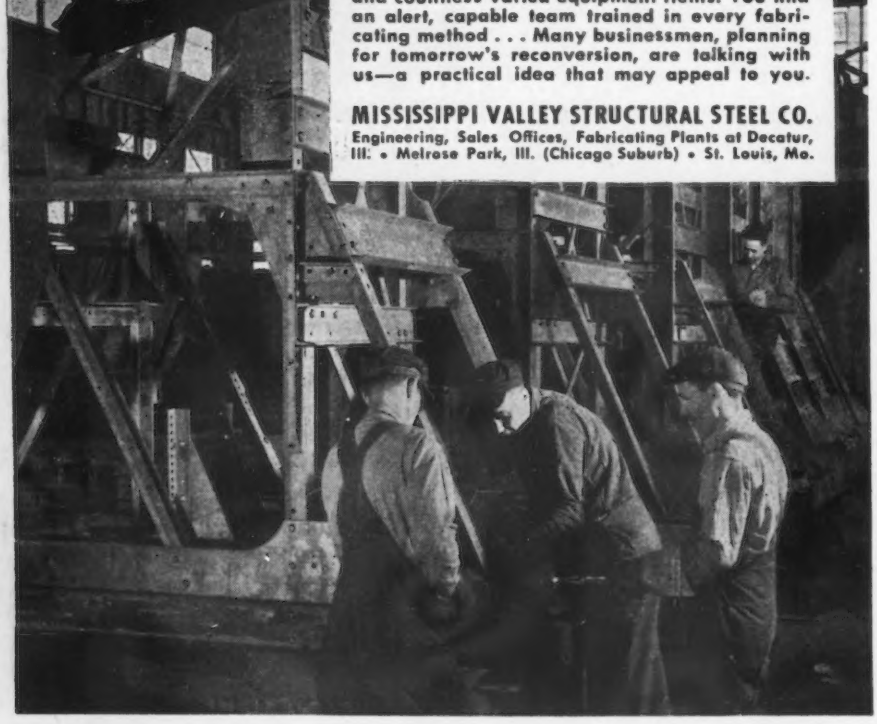
"Originators of Paint Sticks"

LOOK FOR MEN . . . not metal

When you need fabricated steel, look for men—not metal. Look for technical background, for ingenuity, for the keen "know how" that comes from actual doing . . . You find here a seasoned organization that has fabricated vessels and drydocks for the Navy and Maritime Commission, unit construction bridges for the Army, war production plants, and countless varied equipment items. You find an alert, capable team trained in every fabricating method . . . Many businessmen, planning for tomorrow's reconversion, are talking with us—a practical idea that may appeal to you.

MISSISSIPPI VALLEY STRUCTURAL STEEL CO.

Engineering, Sales Offices, Fabricating Plants at Decatur, Ill. • Melrose Park, Ill. (Chicago Suburb) • St. Louis, Mo.



PRICES

COKE

Furnace

	Per Net Ton
†Connellsville, prompt	$6.50*

Foundry

†Connellsville, prompt	7.50
Fayette County, W. Va. (Beehive)	8.10
By-product, Chicago	12.30
By-product, New England	13.75
By-product, Newark	12.40 to 12.9
By-product, Philadelphia	12.38
By-product, Cleveland	12.30
By-product, Cincinnati	11.75
By-product, Birmingham	9.30†
By-product, St. Louis	12.02
By-product, Buffalo	12.50

*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.o.b. oven.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	31.00
60% but less than 65%	31.00
Less than 60%	30.00

REFRACTORIES

(*F.o.b. Works*)

Fire Clay Brick	Per 1000
Super-duty brick, St. Louis	$64.00
First quality, Pa., Md., Ky., Mo., Ill.	51.00
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.50
Silica Brick	
Pennsylvania and Birmingham	$51.00
Chicago District	53.00
Silica cement, net ton (Eastern)	9.00
Chrome Brick	Per Net Ton
Standard, chemically bonded, Balt., Plymouth Meeting, Chester	$54.00
Magnesite Brick	
Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00
Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

INGOTS

Carbon, Rerolling grade

Base per gross ton, f.o.b. mill.... $36.00

Exceptions: Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., $34.25; Carnegie-Illinois Steel Corp. (Pencoyd Plant), $38.25.

Carbon, Forging Quality

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Exceptions: Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports.

Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Massillon, Pittsburgh $45.00

Exceptions: C/L delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

	Black	Galv.
Steel (Butt Weld)		
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

YOU CAN DEPEND UPON AN
R-S ROTARY HEARTH
Here is an R-S gas-fired, Rotary Hearth Heat Treating Furnace with three-zone automatic temperature control which is performing a day-in and day-out task of vital importance to our war effort. R-S engineering ability and attention to construction details make this furnace a worthy companion to other R-S Furnaces of Distinction.
Resolve today that your next heat treating investment will be in R-S Furnaces. You, too, will appreciate their over-all efficiency, the expert advice of R-S heat treating engineers and the reliability of the manufacturer.
Prompt deliveries assured.
FURNACE DIVISION
R-S PRODUCTS CORPORATION
4524 Germantown Ave. • Philadelphia 44, Pa.
R-S Furnaces of Distinction
FORGING • ANNEALING • SALT BATH • CONVECTION • CAR HEARTH • METAL MELTING • ROTARY HEARTH • CONTINUOUS CONVEYOR • PLATE AND ANGLE HEATING
★ BUY WAR BONDS ★

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.50*	*$25.00*	*$26.50*	*$25.50*	.....	.....
Brooklyn	*27.50*			*28.00*	.....	.....
Jersey City	*26.53*	*26.03*	*27.53*	*27.03*	.....	.....
Philadelphia (5)	*25.84*	*25.34*	*26.84*	*26.34*	*$30.74*	.....
Bethlehem, Pa.	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass (3)	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50	.....
Birdsboro, Pa. (4)	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1)	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio	*23.94*	*23.94*	.....	*25.11*	.....	.....
Canton, Ohio	*25.39*	*24.89*	*25.89*	*25.39*	*32.69*	.....
Mansfield, Ohio	*25.94*	*25.44*	*26.44*	*25.94*	*32.86*	.....
St. Louis	*24.50*	*24.50*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	*35.46*	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	*32.42*	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	*32.42*	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	34.00
Lyles, Tenn. fc.† (2)	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	*39.80*	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*26.95*	.....	.....	.....	.....	.....
San Francisco	*26.95*	.....	.....	.....	.....	.....
Seattle	*26.95*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

(2) Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

(3) Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $2 per gross ton above maximum prices.

(4) E. & G. Brooke Co. permitted to charge $1.00 per ton extra.

(5) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. For ton lots f.o.b. shipping point, in cents per lb.

Copper, electrolytic, 150 and 200 mesh	21⅛ to 23⅛c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh	13½ to 15c.
Iron, crushed, 200 mesh and finer	4c.
Iron, hydrogen reduced, 300 mesh and finer	63c.
Iron, electrolytic, unannealed, coarser than 300 mesh	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh	42c.
Iron, carbonyl, 300 mesh and finer	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh, 11½ to 12½c.	
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh, 8½c. plus metal	
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

		Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
2	in. o.d. 13 B.W.G.	15.03	13.04	12.33
2½	in. o.d. 12 B.W.G.	20.21	17.54	16.58
3	in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½	in. o.d. 11 B.W.G.	28.37	24.62	23.15
4	in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

Correct working pressure

MEANS BETTER OPERATION OF PNEUMATIC EQUIPMENT

Better control helps operators get more production. Many jobs on arbor presses, riveters, air chucks, cylinders, air vises, and other pneumatic machinery can be handled better at reduced pressure rather than at full line pressure. With a Hannifin piston-type pressure regulator for each machine, the correct and most efficient working pressure is instantly available. The wide range of adjustment makes this valve adapted to many different service needs. Write for Bulletin 56-A.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue Chicago 24, Illinois

HANNIFIN

PRESSURE REGULATING VALVES

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*
Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets *(7/16 in. and smaller)*
Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws
Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES
(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$40.00
Angles bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham: spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

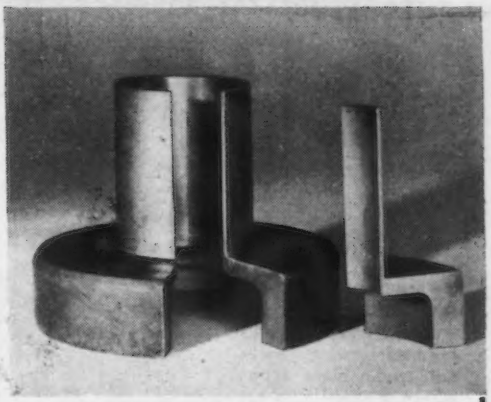
ROOFING TERNE PLATE
(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

NEW PRESSING DEVELOPMENTS

For Many Industries

This flange is made of
.500" Steel
Barrel .071" ± .001"



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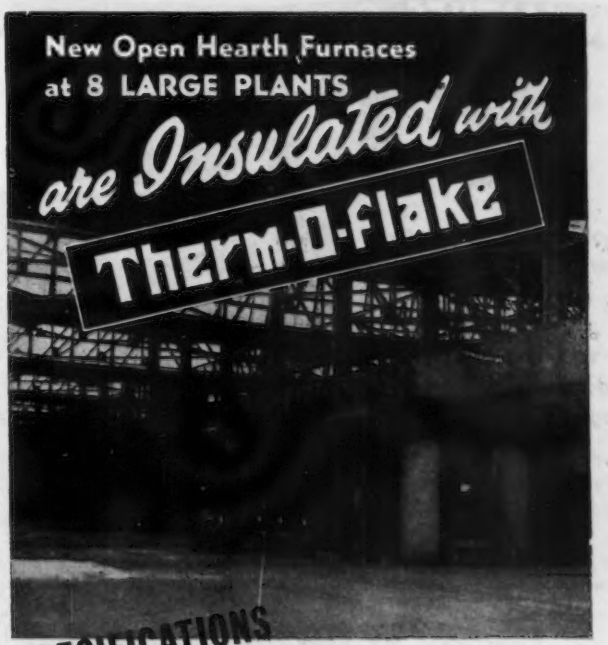
New Possibilities on Tolerances!

What can controlled press operations do for you?

Pioneering on the forefront of press developments, Presteel has the experience and wish to plan ahead with you.

Sales Representatives in Principal Cities

WORCESTER PRESSED STEEL CO.
99 Barber Avenue Worcester 6, Mass.



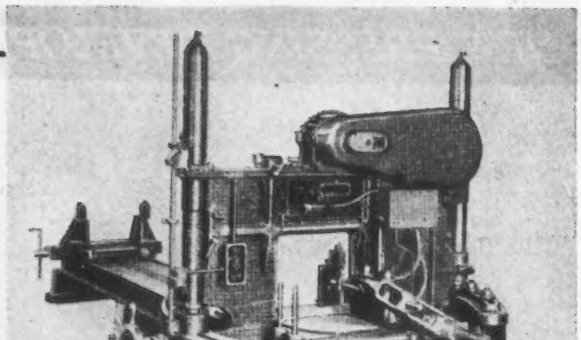
SPECIFICATIONS
for Greater Fuel Economy
Improved Working Conditions

Therm-O-Flake Casting Vertical walls — bulkheads — roofs — arches.
Therm-O-Flake Brick Flue Walls and Arch — Checker Chamber Walls. Slag Pocket Walls.
Therm-O-Flake Concrete Flue — Checker Chamber Hearth Bottoms.

Illinois Clay Products Company
JOLIET, ILL.

High Temperature INSULATION

CUTS the Toughest Steels and Largest Sizes *easily.*



This giant hydraulic metal - cutting saw is more than just a larger hack saw. It is a new development in metal-cutting methods that introduces a new principle of metal sawing — the Roll-stroke blade action makes it possible to cut the toughest steels in the largest sizes easily and rapidly. It also permits a simple and efficient, very low pressure Hydraulic Feed System.

Built for heavy work, completely enclosed in heavy housing, this machine will stand up under the rough usage of the average steel mill warehouse and forge shop, where it will speed cutting-off, and reduce material loss.

MARVEL No.18
Giant Hydraulic Hack Saw
Capacity 18"x18"

Cuts angles up to 45° by simply swiveling upper machine housing.

Write for Catalog

MARVEL SAWS

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U. S. A.

Eastern Sales Office
225 Lafayette St., New York

LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from ⅜" to 4" and the experience to help you get the most out of this type of machine.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA
MACHINE COMPANY
TOLEDO OHIO

PRICES

Ferromanganese

78-82% manganese, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Ton lots (packed)	141.00
Less ton lots (packed)	143.50

Premium, $1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Electrolytic Manganese

99.9% manganese, maximum base contract price per lb. of metal, bulk, f.o.b. shipping point, with freight allowed to destination. Size 1" x D.

	Eastern Zone	Central Zone	Western Zone
Carload lots	37.60c.	37.85c.	38.15c.
l.c.l. lots	39.60c.	38.60c.	40.65c.

Spiegeleisen

Maximum base contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 1% max. Si	19-21% Mn 1% max. Si	26-28% Mn 1% max. Si
Carloads	$35.00	$36.00	$49.50
Less ton*	47.50	48.50	62.00

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% silicon	6.65c.	7.10c.	7.25c.
75% silicon	8.05c.	8.20c.	8.75c.

Spot sales 45c. per lb. higher for 50% Si; 30c. for 75% Si. For extras and premiums see MPR 405.

Silvery Iron

(*Per Gross Ton, base 6.00 to 6.50 Si*)

F.o.b. Jackson, Ohio	$29.50*
Buffalo	30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% silicon.

	Eastern Zone	Central Zone	Western Zone
Car lots	3.35c.	3.50c.	3.65c.

Spot prices ¼c. higher per lb. of briquet. For premiums and extras see MPR 405.

Silicomanganese

(*Per gross ton, delivered, carloads, bulk*)

3.00 carbon	$120.00*
2.50 carbon	125.00*
2.00 carbon	130.00*
1.00 carbon	140.00*
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.†
Packed	6.05c.†
Less ton lots	6.55c.†

*Spot prices are $5 per ton higher.
†Spot prices ¼c. higher.

Ferrochrome

(65-72% *Cr*, 2% *max. Si*)

OPA maximum base contract prices per lb. of contained Cr, lump size in carlots, f.o.b. shipping point, freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
0.03% carbon	25.00c.	25.40c.	26.00c.
0.06% carbon	23.00c.	23.40c.	24.00c.
0.10% carbon	22.50c.	22.90c.	23.50c.
1.00% carbon	20.50c.	20.90c.	21.50c.
2.00% carbon	19.50c.	19.90c.	20.50c.

Spot prices are ¼c. higher per lb. contained Cr. For extras and premiums see MPR 407.

PRICES

Other Ferroalloys

Ferrotungsten, Standard grade, lump or ¼X down, packed, f.o.b. producer's plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten. 10,000 lb. or more	$1.90
Ferrovanadium, 30-35%, contract basis, f.o.b. producer's plant, usual freight allowances, any quantity, per lb. contained vanadium.	
Open Hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	$1.50
Vanadium pentoxide, 88%-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5	$1.10
Ferroboron, contract basis, 17.50% boron minimum, f.o.b. Niagara Falls, carlots, per lb. alloy	$1.20
Ton lots	$1.25
Silcaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	23c.
Silvaz No. 3, contract basis, f.o.b. Niagara Falls, all quantities, per lb. of alloy	40c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 100 lb. and over, maximum based on rate to St. Louis, per lb.	45c.
Bortam, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Borosil, 3% to 4% boron, 40 to 45% silicon, f.o.b. Philo, Ohio, per lb. contained boron	$7.00
Ferrocolumbium, 50% to 60%, f.o.b. Niagara Falls, ton lots, per lb. contained columbium	$2.25
Less ton lots	$2.30
Ferrotitanium, 40%-45%, f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained titanium	$1.23
Less ton lots	$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per gross ton	$142.50
3%-5% carbon	$157.50
Ferrophosphorus, 18% electric or blast furnace, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equaled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75 per cent, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	95c.
Calcium molybdate, 40%-45%, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained molybdenum	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Less ton lots	16c.
Zirconium, 12-15%, contract basis, carlots, bulk, per gross ton	$102.50
Packed	$107.50
Less ton lots	$112.50
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, per lb.	7.50c.
Ton lots	8c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	9.50c.
Ton lots	10.00c.
Less ton lots	10.50c.

GET TOMORROW'S WELDING DONE TODAY

...with the help of Ransome Positioners

It is no exaggeration to say you can do just that. For, when Ransome equipment is installed, your welders will no longer have to use their time and energy in shifting the position of their work . . . will no longer be delayed by waiting for crane service.

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Write for full details, stating the general nature of your welding job.

RANSOME MACHINERY COMPANY

Ransome WELDING POSITIONERS

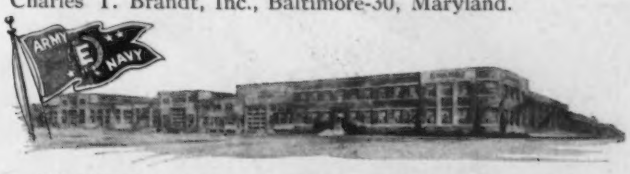
Forming, Welding, Fabricating—

3000 lb. Electro Processing Oven of ¼" steel plate (50" long x 36" inside diameter) shown with rock wool jacket removed . . . fabricated by Brandt for a large cork board plant.

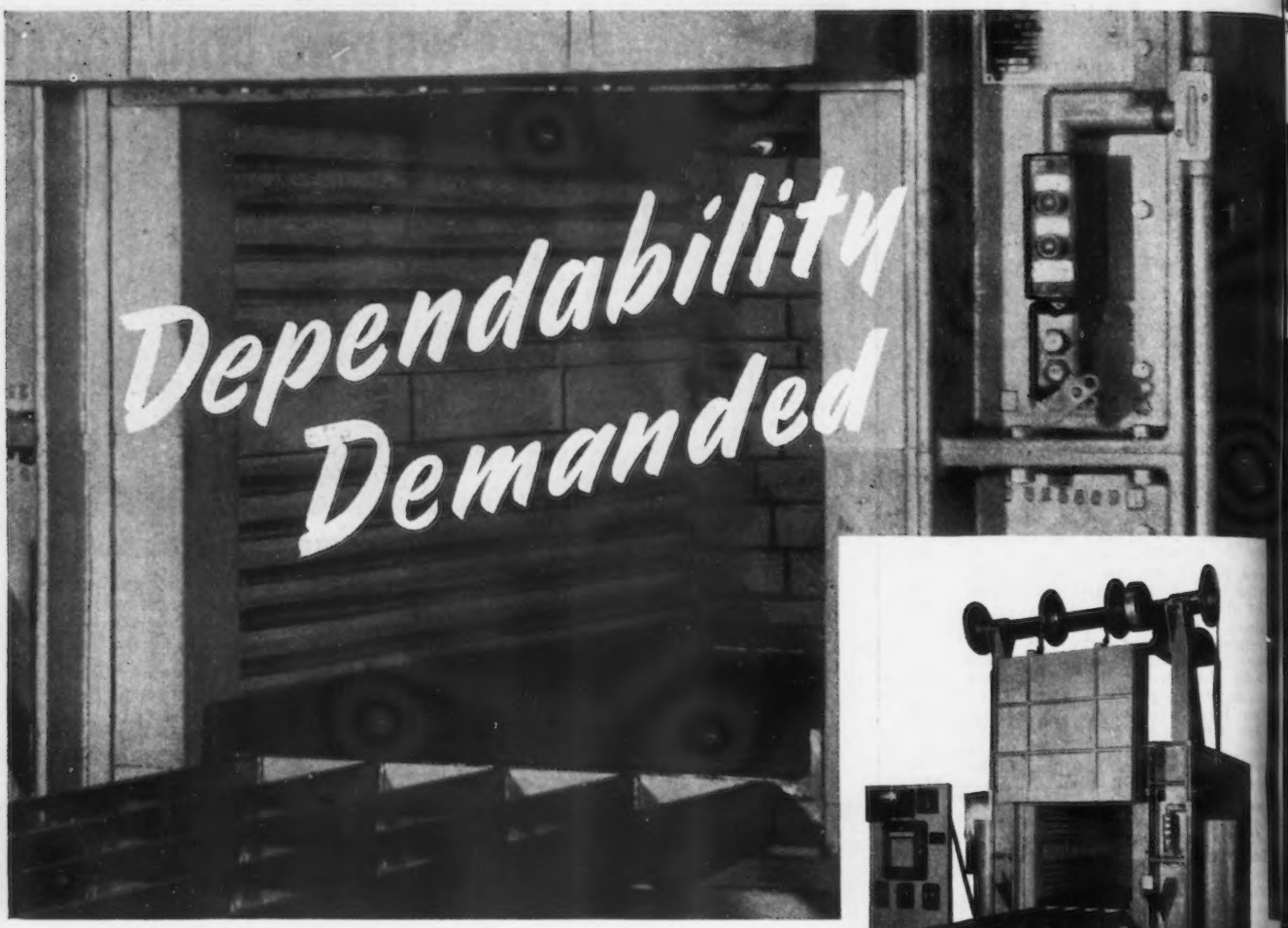
Call BRANDT of Baltimore

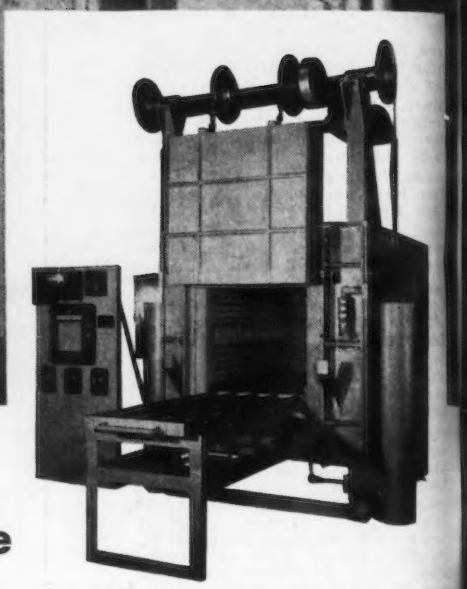
for Precision in Heavy Plate and Sheet Steel Work

Here, at your command, is an 8½ acre plant . . . with the most modern equipment for shearing, rolling, forming, welding and completely fabricating ferrous, non-ferrous and alloy metals to your specifications . . . from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. Address: Charles T. Brandt, Inc., Baltimore-30, Maryland.



BRANDT of Baltimore—*Craftsmen in Metal Since 1890*





Armstrong's Insulating Fire Brick selected for this heat-treating furnace

DEPENDABLE and accurate temperature control is a prime requirement of furnaces used in the heat treating of precision tools. To insure this important quality the H. O. Swoboda Company of New Brighton, Pennsylvania, selected Armstrong's Insulating Fire Brick as the lining for its new electrical heat-treating furnace.

This model has a heating chamber 30" square by 4' 6" deep lined with Armstrong's A-23 Insulating Fire Brick. Capable of maintaining temperatures up to 2000° F. for precise periods, the furnace is equipped with automatic controls and is intended for tool room use. The dependability of Armstrong's Insulating Refractories—proved under severe service conditions over the years—insures its accurate operation.

All five Armstrong's Insulating Fire Brick (for temperatures from 1600° to 2600° F.) have the requirements for dependable, effective service: light weight, high insulating efficiency, uniformity, great crushing strength (hot and cold), resistance to spalling, and low heat storage.

At Armstrong's you can be sure of getting more than the right brick for the job. You get the counsel of Armstrong's engineers who have a background of more than 29 years' experience in the manufacture and application of lightweight insulating refractories. They will be glad to help you solve your furnace problems. Write to Armstrong Cork Company, Insulating Refractories Department, 4912 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INSULATING REFRACTORIES